



# TOXIC TERROR

Dumping of Hazardous  
Wastes in the Third World



Third World Network

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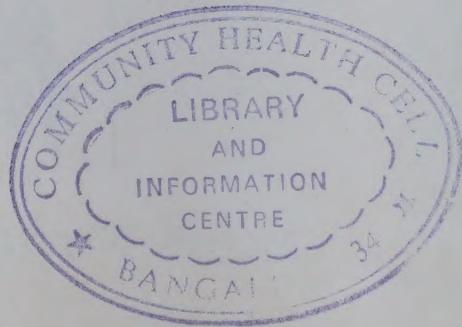
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# Preface

IN JUNE 1988, the scandal of toxic wastes being sold to African countries occupied newspaper attention throughout the world. It was indeed a very scandalous thing. Unfortunately, it was not an isolated incident, nor did it occur only in 1988.

In fact toxic wastes dumping has been going on for several years. And the root of the problem is that companies and government agencies in the West, faced with more stringent environmental laws in their own countries, find it cheaper to export their wastes to poor Third World countries. They pay these countries sums of money which are far less than what they would spend if they were to dispose of the wastes themselves.

But where does this leave poor Third World countries? They are left literally holding on to the toxic wastes, their citizens suffering health consequences and their environment destroyed. From the perspective of Third World peoples this situation is intolerable and unacceptable.

The Third World Network therefore decided to investigate the problem of toxic wastes dumping in the Third World. The resulting report was sent out to governments and organisations around the world.

This book puts together this report

and other international documents related to toxic wastes and their export to the Third World, as well as gives recommendations on what Third World governments and peoples should do in future to minimise the risk of hazardous wastes, whether imported or locally produced.

The book is divided into five parts:

- **Part I, The Third World as a Dump**, contains reports of cases of toxic wastes dumping in various parts of the Third World.
- **Part II, Lessons from the First World**, contains documents on the First World experience.
- **Part III, What is Toxic Waste**, explains the various aspects of toxic waste contamination.
- **Part IV, Law and Policies to Control Waste**, looks at the various laws in the industrial countries on waste and the measures that Third World countries can take to control hazardous waste dumping.
- **Part V** contains valuable documents related to guidelines for the international control of the toxic waste problem.

S M Mohd Idris  
Coordinator  
Third World Network  
1988



## Part I

# THIRD WORLD AS A DUMP

# Toxic waste dumping in Third World countries

By Third World Network

## TOXIC WASTES DUMPED IN THE THIRD WORLD: RECENT FINDINGS

IN RECENT YEARS, industrialized countries have been trying hard to export their toxic waste to Third World countries. South and Central America have received toxic waste in the past, and now African countries have been offered foreign cash to accept toxic waste. Shipments of toxic waste have been sent out to be deposited in Third World countries.

The extent of the problem is more massive than previously believed. A study by the Greenpeace Environmental Organisation lists 115 shipments of toxic waste during the past two years that have been sent to Latin American and African countries. These countries include Mexico, Argentina, Brazil, Panama, Uruguay, Morocco, Senegal, Gabon, Guinea Bissau, Djibouti, Zimbabwe and South Africa.

Among the shipments or planned shipments of toxic waste to the Third World are the following:

1. 15,000 tons of toxic industrial incinerator ash from Philadelphia, United States, was dumped on the Guinean island of Kassa with a Norwegian company acting as middleman. The toxic

ash killed a large part of the island's vegetation. Guinea importers were paid US\$40 per ton which might have cost US\$1,000 per ton to dispose of in the United States in compliance with Government regulations. On 13 June, Norway agreed to remove the waste following the arrest by Guinea of Norway's Consul-General Sigmund Stromme for complicity in the dumping. Mr Stromme is also director of the joint Norwegian-Guinean company, Guinomar which imported the waste.

2. Up to 4,000 metric tons of chemical (and possibly radioactive) waste from Italy was dumped in the port of Koko in Nigeria. The waste, including deadly dioxin and poly-chlorobiphenyl (PCB) was shipped in drums and containers in several consignments from Italy since September 1987. Italian and Nigerian businessmen arranged the deal and paid the owner of the depot a mere 500 Naira (about \$250) a month to store the waste brought in by a white man. Another Italian businessman had also planned to export nearly 100,000 tonnes of wastes (including PCB, exhausted earths, asbestos fibres and assorted pharmaceutical and industrial residues) to Nigeria. Nigeria on 10 June recalled its Ambassador in Rome,

arrested 15 people and threatened to execute the importers.

3. In Congo, 5 people (including three top government officials) were arrested in mid-June 1988 for having agreed to import 1 million tons of industrial waste that would have made US\$4 million over 3 years. The Dutch transport company Van Santen had announced in May that it had received a Congo government licence authorising shipment of the waste. The Congo government has now stated it is banning imports of toxic waste.

4. A British company Secso (with a Gibraltar postal address) offered a contract to the West African country Benin to store 5 million tonnes of waste. Benin was offered US2.50 dollars a tonne compared to \$40 a tonne offered by other companies to Guinea Bissau and the normal cost of disposing waste in Europe at \$140-160 per tonne. (Report from European Environment Association).

5. Guinea Bissau was offered US\$120 million a year (equivalent to its Gross National Product) by one Swiss and two British firms to bury industrial waste. The government in June 1988 announced its decision to reverse the agreement and ban toxic waste imports.

6. A West German-based company is planning to export to Liberia a range of hazardous wastes, including contaminated earth. The company cites "adequate dumping capacity", "political stability because it is closely allied to the United States" and its good location as why Liberia was a suitable dump. It also states: "We can solve the waste problem in West Germany by building a depot in Liberia." (Report from Greenpeace).

7. Another document revealed by Green-

peace shows plans to build a US\$100 million US-financed waste incinerator plant in Tongo with a capacity to burn up to 20 tons of toxic waste per year.

8. In the Balkans, 4,000 tons of deadly toxic waste was dumped at Sulina where the Danube flows into the Black Sea. Late in July 1988, seven Romanian politicians were jailed in Bucharest for between 11 and 18 years for their part in the dumping. It was alleged that this was the result of a deal between the Romanian Ministry of Foreign Trade, West Germany, the Netherlands and Italy to allow dumping at Sulina by a Liechenstein firm called Kimika. After the waste was dumped the barrels in which it was stored began to leak. This resulted in "considerable environmental damage" in the Danube delta, which has some of the rarest species of wild birds on the Black Sea. The ancient town of Sulina has been declared an ecological disaster area.

9. The Soviet Union dumped "several tons" of radioactive waste in Benin, West Africa, between 1984 and 1986. A report in the *Africa Newsfile*, July 1988, a London-based fortnightly bulletin, implies that Benin President Mathieu Kerekou was aware of the secretive dumping. Former head of Benin's air force, Christophe Fandohan, was reportedly dismissed after he attempted to stop the Soviets from depositing the waste under the tarmac of the military airfield they were constructing at Canna, 15 km south of Abomey. At least two Benin workers were said to have died mysteriously at Canna in 1984, resulting in a temporary halt of the airport project.

More Soviet radioactive waste was also discarded in a disused stone quarry at Dan, 25 km north of Abomey. The area has since been marked a "military



*Toxic waste in leaking drums from Italy dumped at port of Koko, Nigeria*



*Rotting barrels of toxic waste at Klong Toey, Bangkok recently discovered. The origins and contents of the containers remain a mystery.*

zone" and restricted. "A recent shipment of nuclear waste from a western country transported by the 'ganvie' (Benin's only merchant-marine vessel) from Le Havre in the north of France, is reportedly buried in Saklo also in the Abomey region," the bulletin reveals.

Besides the United States and Europe, Japan is also likely to be a party to toxic waste dumping. In 1979, the Japanese government announced an 'experiment' to dump 10,000 drums of low-level nuclear waste in the South Pacific, near the Mariana islands. If the experiment was "successful", Japan would dump up to 100,000 curies a year at the same site. The scheme was postponed following protests from Pacific Island countries. Japan, with 25 reactors and another 58 being planned, now stores high-level nuclear waste in temporary sites; it also has 460,000 containers of low-level waste stored in metal containers and this is growing by 60,000 annually. Both Japan and the United States threaten to dump their nuclear waste in the South Pacific.

However, toxic waste dumping is not only carried out by industrialised countries. According to the Thai newspaper, *The Nation* (18 June 1988), thousands of falsely-marked containers of toxic waste were lying unclaimed at Bangkok's Klong Toey Port for years. They were shipped from Singapore to bogus companies in Thailand. The rusting and broken containers lying in an outdoor yard were contaminating the water supply of a densely-populated slum nearby, according to a United Nations expert. (*The Star*, Malaysia, 24 June 1988).

## CAUSES FOR TOXIC WASTE DUMPING IN THE THIRD WORLD

The dumping of such huge amounts

of hazardous waste matter in Third World countries stemmed from restrictive disposal regulations in the industrialised countries due to health and environmental reasons. In recent years, toxic waste regulations have become more and more stringent in the West. According to Jan Huismans, director of the International Register of Potentially Toxic Chemicals (an arm of the UN Environment Programme): "In the Netherlands, you virtually can't put anything anywhere, because it's hard to dispose of it without bringing it in contact with the water table. France the United Kingdom and West Germany have stringent regulations, and Denmark and Sweden require very detailed technology." Reluctant to comply with the vigorous and expensive rules on toxic waste disposal, the easy way out was chosen by Western companies to dump toxic waste in poor countries with large areas of land. These Third World countries have hardly any regulations (if any) restricting or controlling toxic waste disposal.

The dumping toxic waste is often the result of legal contracts by companies or governments of Third World countries to accept waste from industrialized countries in exchange for hard cash. There have been two 'waves' of such contracts signed between companies or governments of rich countries with Third World governments to dump toxic waste in the Third World. The *first wave involved the USA in 1980 coinciding with the tightening up of laws concerning toxic waste in the USA. The second wave in 1987 and 1988 involving European countries*, was probably linked to the 1986 EEC directive and recent decisions arrived at by the Organisation of the European Cooperation and Development (OECD) on the subject of trans-



*Five at chemical warehouse in Basle, Switzerland. Hundreds of barrels with toxic substances exploded and were washed by firemen's hoses into the Rhine, contaminating and killing all life in it. (Photo: Keystone Press)*

*Firemen protecting themselves from toxic fumes hours after the Basle blaze, inspect the damage. (Photo: Keystone Press)*



portation of toxic waste. Western companies find it much cheaper to export toxic wastes to the Third World than to dispose of the wastes in their own countries. Companies from the West are currently offering African countries US\$40 per ton of toxic waste. In comparison, the dumping of waste in Europe may cost between US\$160 and US\$1,000 per ton, according to a Greenpeace study.

In other cases, however, the toxic waste is dumped illegally. The lure of money may be too attractive for many Third World officials to resist, thus resulting in bribery being used by unscrupulous parties to solicit for illegal dumping. Furthermore, regulatory and administrative responsibilities in most developing countries are badly defined and no clear line of authority is present.

For example: the government of Congo has just arrested some government officials accused of establishing a fictitious company with the intent of covertly accepting 1 million metric tons of industrial waste. In an earlier case, Congolese officials had agreed to accept 1 million metric tons of polluted chemical waste from the Netherlands, Belgium, Luxembourg and West Germany for storage or incineration in exchange for US\$92.6 million.

### **SYNDICATES AND COMPANIES IN THE TOXIC WASTE TRADE**

The export of toxic waste is being handled by syndicates or companies in the toxic-waste trade in the industrialised countries. In fact, toxic-waste disposal has sprouted its own industry which makes profit from dumping. These are companies which specialise in buying toxic wastes from industrial plants or government agencies and then arrange for them to be shipped to Third World countries. According to Green-

peace, Britain had become a concentrating point for the international waste disposal industry. "Household waste from the United States is exported to the United Kingdom where it is being dumped in old mine shafts in a very irresponsible manner," reports Mr Ernst Klatte, the Greenpeace representative in Brussels. He added that many waste disposal companies are also operating from London, including one company responsible for large-scale waste exports to Guinea Bissau. (*The Star*, Malaysia, 28 June 1988).

Another study conducted by David Weir and Andrew Porterfield (of the Centre for Investigative Reporting in San Francisco) reveals the existence of companies in the United States buying toxic wastes for sale to the Third World. (Refer article by David Weir and Andrew Porterfield, "US Exports Hazardous Waste to the Third World" in Chapter 2). The biggest known such operation was run by two New York - based men, the Colbert brothers, who amassed a huge volume of various kinds of hazardous wastes (including outdated pesticides, industrial chemicals and solvents) and stored them in warehouses up and down the east coast. Some of the wastes were relabelled as pure chemicals and sold to companies or governments in the Third World, including India, South Korea and Nigeria. For instance, they relabelled a shipment of waste as pure dry cleaning solvent and sold it to a company in Zimbabwe which bought it with funds from the US Agency for International development. What was most shocking is that not only companies but also many US government agencies (including the US Department of Agriculture, the Environmental Protection Agency, many city governments and various branches of the military) sold their wastes to the Colberts.

In another case investigated by Weir and Porterfield, a Norwegian firm registered in the United States was planning to export 250,000 tons of Philadelphia incinerator ash to Panama to build a roadbed through a wetlands area. If this deal worked out, Panama would import a total 7 million tons of the hazardous ash for one roadbed project alone. The road would be part of a big development project along the Panama coast including a resort hotel, to be built by the Norwegian parent company. (This is the same Philadelphia ash, 15,000 tons of which were actually shipped to Guinea.)

The United States produces between 250 to 400 million metric tons of toxic wastes a year. As landfills and dumps fill up in the United States, it looks desperately to other countries to receive its wastes.

### **EFFECTS OF TOXIC WASTE ON THIRD WORLD**

Toxic wastes are the world's most unwanted products. In the last decade, there has been growing awareness in the industrialised countries that the toxic by-products of industry are very difficult if not impossible to make safe before disposal. It is very expensive to treat many of the wastes to a satisfactory degree of safety. In the case of other wastes, especially radioactive or nuclear waste, it is quite impossible to treat them to make them safe; for millions or even billions of years some of these wastes will remain radioactive, and thus dangerous. Containers made to contain these wastes, however solid and strong, and dumpsites built to take in such containers, however concrete, will not last long enough. Toxic chemicals or radioactive materials and other wastes will usually have a longer

lifespan than their containers and dumpsites, and may then seep through the rusted or broken containers and dumps, into the air or through the soil and into the water system. The waste materials could then emerge through the food chain: from the soil to plants and vegetation taken in by human beings or by animals (which in turn supply meat or milk to human beings); from the water system to reservoirs and household water. Or the materials (especially radioactive materials) could be transported by air and threaten human health as they enter the body and bloodstream through breathing.

Because of awareness of the intractability of the toxic waste problem, the industrialised countries have recently introduced tighter laws forcing polluting industries to treat their waste material, or to store it as safely as possible, as well as to pay for expenses incurred by the state in cleaning up their wastes. It is because of these developments that the companies and industries involved are now trying to export their untreated wastes to the Third World.

The Third World is even more ill-equipped than the industrialised countries in dealing with toxic wastes. Environmental awareness is still lacking among most Third World policy-makers; there are hardly any laws regulating waste disposal; and very little action on the ground by governments to monitor, let alone act against, the storage and disposal of toxic wastes.

There are many negative effects of inadequate toxic waste disposal in the Third World, for both the wastes generated within the Third World itself and the wastes it may import from other countries. These include environmental, health and economic costs.



*A PCB victim suffering from severe rash all over the back. (Photo: Jishu – Koza)*

## TOXIC WASTES DAMAGE THE ENVIRONMENT

If dumped indiscriminately on land or in rivers, the wastes have an immediate effect in contaminating the soil, killing surrounding vegetation, polluting the underground water system; or in contaminating the riverine and sea resources, including the killing of marine life. Even if the wastes are stored in containers and carefully placed in concrete dumps, they will most likely escape in future (from a few months to a few decades) as the containers and sites corrode with time. After escape, the environment will then be damaged. In many Third World countries, the rivers have been polluted by industrial effluents from factories and mills, killing off fish resources, reducing the incomes of fisherfolk, and threatening the safety of millions of villagers who depend on the river for water. Soil which is contaminated is also made useless for agriculture. Environmental damage thus depletes precious resources, and threatens human health.

## TOXIC WASTES THREATEN HUMAN HEALTH AND LIFE

The thousands of chemicals and radioactive substances produced by industry are poisonous to health and can also kill. The results can be horrendous. In the United States, the Hooker Chemical Company dumped thousands of drums of toxic waste at Love Canal, New York in the 1940s. In the late 1970s, foul-smelling liquids and sludge seeped into the basement of houses built on top of the dump. A health emergency was declared, and in 1980 tests showed some residents had damaged chromosomes (raising the spectre of cancer among the living and unpredictable damage to future generations);

and increased rates of cancer, seizures, miscarriages and birth defects.

In Morocco, 31 children died of lead poisoning due to waste from a lead works being dumped in the middle of a village. In Japan, mercury poisoning of water at Minamata Bay caused thousands of birth defects and other ailments. Japanese industry paid over US\$200 million to compensate thousands of victims.

In Malaysia, a company producing rare earths (partly owned by Mitsubishi, Japan) was found to have disposed of its radioactive waste indiscriminately for some years; the waste is now stored in the factory compound pending transfer to a dumpsite. Medical tests in early 1988 found that all children tested had lead in the blood above the toxic level.

## TOXIC WASTES BEAR VERY HEAVY ECONOMIC COSTS

Because of the health threat posed by toxic wastes, they need to be treated or stored properly. That bears very heavy economic costs. Another big cost is to "clean up" toxic wastes which already exist and which had over the past decades been dumped carelessly or inadequately, either on land and water or in dumpsites which are unsatisfactory.

In the United States, the Environmental Protection Agency had identified 74,000 dumpsites, of which 32,000 are rated as bad as, or worse than Love Canal; only 7 or 8 a year are being cleaned up under a "superfund" financing system. In 1980, the President's Council on Environmental Quality estimated the cost of cleaning up would be between US\$28-55 billion. In Love Canal alone, the clean-up bill was estimated at US\$130 million.

Thus, even from the economic point, it is not worthwhile for Third World countries to accept the toxic wastes offered to them in exchange for money.

The short-term monetary gain from importing toxic wastes would be very meagre indeed, compared to the damage to health and environment, as well as the eventual costs needed to clean up the wastes when they are, at last, found to be damaging the health and ecology of the Third World countries concerned.

### MOVES AGAINST TOXIC WASTES EXPORT

After the scandal of toxic waste export to some African countries was exposed, there have been a number of moves in the Third World to prevent or reduce toxic wastes from entering.

The most important of these moves was a resolution passed by the Organisation of African Unity (a major official grouping of African countries), at the end of May 1988, condemning the use of African territory as a dumping ground for waste. It called this practice "a crime against Africa and the African people". The resolution also called for a ban on the importation of hazardous and industrial wastes from the continent, and urged African governments which had already concluded agreements for dumping waste on their territory to end the agreements.

Following this major resolution, a number of African governments took action to investigate and stop toxic waste dumping, or to act against those responsible for the practice. Guinea Bissau in June 1988 ended its agreement to accept toxic wastes from three European companies, and thus gave up the US\$120 million a year it was offer-

ed. Congo arrested three top government officials for agreeing to import toxic waste, and instead banned all imports of wastes. Guinea arrested a Norwegian official for importing toxic ash from the United States and forced Norway to remove the waste. Nigeria arrested 15 people responsible for importing wastes from Italy and forced Italy to remove the waste.

The publicity on waste export to Africa also spurred officials in some Asian countries to act on their own waste imports. The Thai government found toxic waste dumped at Bangkok port that came from the United States, Japan, West Germany, Singapore and Taiwan. Shipping agents were asked to send containers of toxic wastes back to Singapore. In the Philippines, eight government departments made a joint resolution banning the importation of toxic wastes and called on Congress to enact laws to protect the environment from harmful wastes. The resolution arose after an American firm attempted to build an incineration plant in Iligan City in 1987. In Lebanon, officials found 2,411 tonnes of wastes dumped since September 1987 in the country by Italy; the Italian government has now agreed to remove the waste by ship.

At the international level, some moves are also being made to counter the toxic waste trade. The *United Nations Environment Programme* is making efforts to get governments to adopt an international convention to control the international movement of hazardous wastes. Two meetings were held in February and June 1988, and a third meeting is scheduled for September 1988, and a conference to conclude the treaty is targeted for March 1989 in Basel, Switzerland. As at July 1988, an expert group looking into the treaty

has listed down a core list of 44 waste materials considered "hazardous". In the negotiations, it was also agreed that intending exporters have to give information on the nature of the waste, quantities and number of shipments. A country intending to import wastes have to give a written consent before the hazardous wastes are shipped, and it must also show evidence of its capacity to deal with the waste. For instance, it must show that the waste would be going to a treatment or disposal facility that has the capacity and the licence to deal with that particular waste. However, there are still many loopholes and areas of contention in the treaty, which negotiators have to iron out. Even the passing of such a treaty will not prevent toxic waste exports unless an international team of experts with sufficient power and resources is able to monitor and check whether the importing countries can store or are storing the wastes safely.

In the European institutions, a number of moves have been taken to discourage toxic waste export to poor countries. In 1986, the *European Economic Community* sent a directive stipulating that developing countries must give their "prior informed consent" before exports can go ahead, and that the importing countries must be capable of treating the wastes to render them harmless. However, only Belgium and Denmark have so far incorporated the directive into their national laws. Even if the laws were to be enacted, it may be impossible to implement satisfactorily. There are at present no international norms on what is proper waste treatment, so it would not be possible to decide whether an importing country can properly treat the wastes.

In May 1988, the *European Parliament* passed a resolution to ban all exports of European wastes to the Third World. On June 17, 1988, the EEC countries' environment ministers met and considered the European Parliament's resolution but decided not to agree to a ban. The British and West German ministers argued that a complete ban was "impractical" and would be unfair to developing countries willing to take such wastes. Instead the ministers called on EEC countries to implement existing rules or to alter the rules to prevent dumping on poor countries. They did not specify how these existing rules could be changed to prevent illegal waste export. They however, admitted that waste exports had increased rather than decreased since the 1986 EEC directive against dumping.

In the United States or Japan and other industrial countries, there are no moves being made by the government to tighten control or impose a ban on toxic waste exports to the Third World.

## RECOMMENDATIONS

The dumping of toxic wastes in Third World territories is now widespread, and has serious health, environmental and economic consequences. Urgent steps must now be taken by various agencies to stop this practice.

## GOVERNMENTS IN THE INDUSTRIALISED COUNTRIES

Governments in the industrial countries, where the toxic wastes originate, have the most important moral responsibility to eradicate the problem. Countries which benefit from the products of industrialism also have the responsibility to *themselves* tackle the

problems brought about by by-products and toxic wastes. They should not enjoy the products but ship out the nasty and unwanted side-products and wastes to other countries. These industrialised countries have now tightened their laws to regulate toxic waste treatment, storage and disposal so as to reduce the harm to their own environment and their people's health. Such legislative development is commendable. However, as recent events show, industries will take the easy (but unethical) option of shipping the wastes to poor countries. Thus a law that regulates toxic waste in an industrial country may be good for that country but inadvertently leads to a concentration of toxic waste problems in the Third World. Thus, the beneficial part of the production process goes to the industrialised countries whilst the worst part (the toxic wastes) is channelled to the Third World, which does not even have the benefit of the good part of the product or process. What is therefore urgently required is for each industrialised country to introduce laws in the country to *ban the export of hazardous wastes to Third World countries*. The principle should be adhered to by each industrialised country, that if there is a production process taking place within a country, that country must be responsible for handling the toxic wastes that emerge from that process, and not transfer the waste problem to other countries. Unless governments in the industrialised countries introduce such laws (to make it an offence for a company to export toxic wastes) and adhere to the principle of responsibility for one's own toxic waste, it would be impossible to stop the trade of toxic waste to the Third World.

## INTERNATIONAL ORGANISATIONS

International and regional organisa-

tions, especially inter-governmental agencies, have a crucial role to play to pressurize governments in both the industrialised countries and in the Third World to stop the transfer of toxic wastes to the Third World. Some of these agencies, such as the United Nations Environment Programme, and the World Health Organisation, have the expertise and mandate to highlight the problem of toxic waste and to arrange for international treaties as well as monitoring mechanisms and to provide technical advice and set up systems of waste control in the Third World. Other institutions, such as the European Parliament, the EEC should intensify measures to get member governments to introduce new laws prohibiting toxic waste export. Taking the example of the Organisation of African Unity, other regional organisations serving the Third World, such as CARICOM for the Caribbean and ASEAN for South-East Asia, should pass similar resolutions or directives to member governments to ban the import of toxic waste, and to monitor the problem as well as aid in the establishment of waste control measures.

## THIRD WORLD GOVERNMENTS

Governments in Third World countries have the urgent responsibility and task of tackling the problem of toxic wastes in a comprehensive and in-depth manner:

1. Each Third World government should introduce laws to ban the importation of hazardous wastes originating from other countries. Those who import such wastes would be committing an offence.
2. Each government should investigate whether at present or in the past there have been agreements by institutions (governmental or commercial) to im-

port toxic wastes. Such arrangements should be investigated and discontinued immediately. Criminal proceedings should be instituted against those who illegally carried out such activities.

3. Each government should urgently carry out an investigation into existing methods of toxic waste disposal, storage or dumping by industrial, agricultural or transport companies or agencies in the country. Toxic dumpsites (whether on land or water systems) should be identified, and assessments carried out as to their safety. Steps should be taken to protect the residents or communities in the vicinity as well as the health of workers handling the waste.

4. The government should then identify existing economic activities that presently or potentially generate toxic wastes, and take measures to get the institutions concerned to reduce their use of toxic substances or to treat their wastes as best as possible before disposal. Strict regulations on waste disposal must simultaneously be set up on the storage and disposal of toxic wastes.

5. A comprehensive law should be introduced to provide for the regulation of the use and management of toxic substances, and for the proper and safe disposal of hazardous wastes. The regulations on toxic substances should, among other things, enable the government to collect information on all toxic chemicals and substances imported and used in the country; require industry to test potentially harmful substances for adverse health and environmental effects; and ensure proper use and storage of the substances. Chemicals and substances which are highly toxic and whose risks outweigh their benefits should be banned from use. The regulation on toxic wastes should enable the government to: re-

gister all hazardous wastes and those that generate and transport the wastes; impose standards of safety for generators and transporters of the wastes; impose safety standards for owners and operators of toxic waste treatment, storage and disposal facilities; and require all producers of hazardous wastes to submit quarterly reports on wastes produced and method of disposal.

6. To monitor and enforce this law, a specific agency (such as the Environmental Protection Agency of the United States) should be set up in Third World countries, charged with the responsibility of controlling toxic substances and toxic wastes.

7. As far as possible to *prevent* or *greatly reduce* the problem of toxic waste, Third World government should first and foremost carefully scrutinise the types of industry or agricultural practices that should be allowed to function. Industries which use large amounts of hazardous substances, or which use even small amounts of highly toxic substances, should be very carefully reviewed, because the often short-term economic gains from such activities are usually greatly offset by the costs in terms of health and environmental effects and the financial expenditure required to dispose of the toxic wastes. Governments should especially guard against foreign companies who want to set up hazardous industries in the Third World, because such industries no longer meet the increasingly strict health and environmental regulations in the industrialised countries from where these companies originate. Governments should also beware of toxic substances and wastes in the agricultural sector which in the Third World is increasingly making use

of hazardous pesticides, many of which are already banned in the industrialised countries. The pesticides are harmful to the health of farmers and consumers of food, as well as to the soil, vegetation and water systems. In short, toxic substances and hazardous industries and production processes should be greatly discouraged or banned in the Third World, as prevention against the huge health and environmental costs incurred in both the production process and the follow-up problem of toxic wastes.

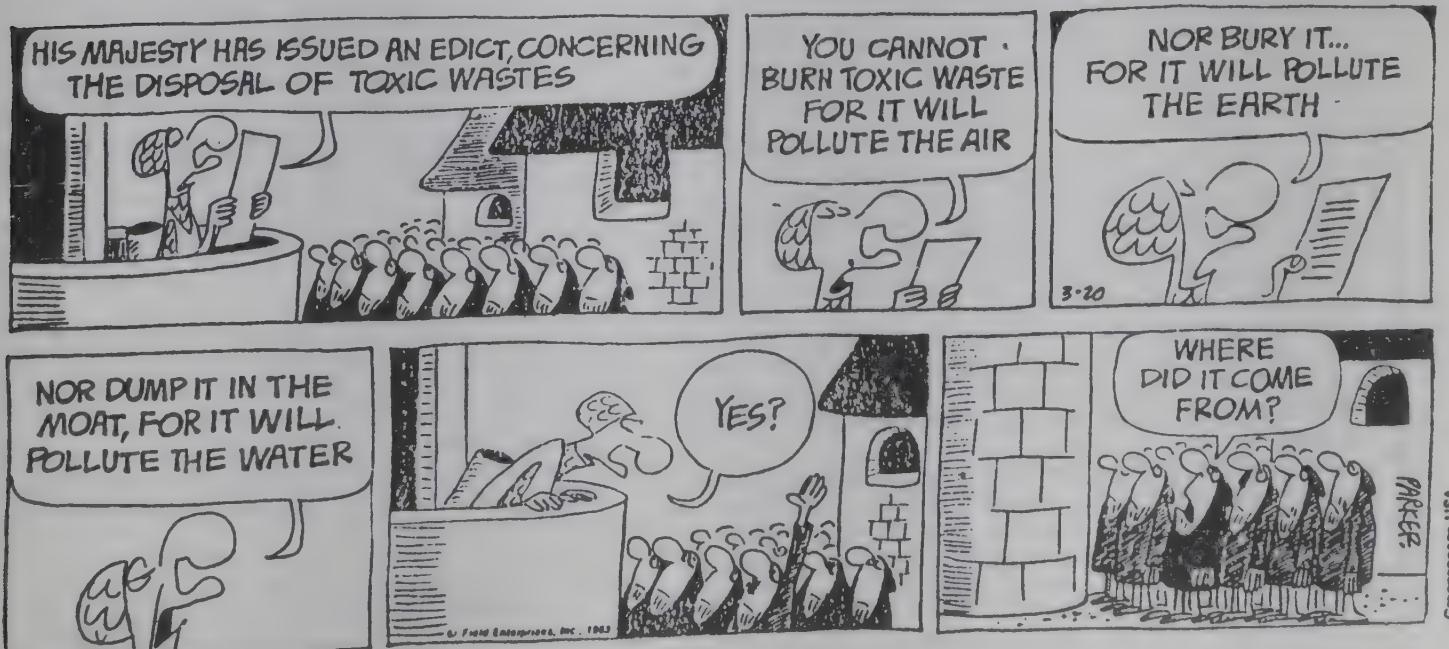
### ENVIRONMENTAL GROUPS AND OTHER NON-GOVERNMENTAL ORGANISATIONS

Environmental groups, other citizen groups and non-governmental organisations in both the industrialised countries and in the Third World have a vital role to play in highlighting the problem of toxic waste exports as well as the general problem of toxic waste disposal and toxic substances. In fact, the scandal of toxic waste exports to the Third World was first exposed by journalists and by environmental groups; without

that exposure it is doubtful if governments would have been alerted or felt sufficiently moved to act.

These groups, and the media, should continue to play their role as investigators and publicisers, as well as make the public aware of the issues and convince their respective governments not to export toxic wastes to the Third World, and not to import toxic wastes from other countries. The groups also have the special responsibility of alerting communities sited near toxic waste dumps or near hazardous industries about the health and environmental hazards posed by these plants and dump-sites and, if needed, to support these communities in asserting their rights to living in a safe environment. Environmental groups and trade unions should also educate workers involved in hazardous workplaces and in handling toxic wastes, about the health hazards arising from their work.

The Third World Network and its related organisations and friends will continue to play its part in monitoring the issue and contribute to the reduction of toxic waste exports to the Third World.



# Deadly offer poor countries find hard to refuse

**LONDON:** The toxic waste dump at the backwater port of Koko on the banks of the River Niger in southern Nigeria is just that — a dump.

Some 10,000 drums, holding 3,800 tonnes of industrial poisons shipped over from Italy, lie rotting in a small, L-shaped compound, surrounded by a three-metre high, rickety wire fence. The site is unguarded and unmanaged. It is also illegal and extremely dangerous.

The 45-gallon drums are mostly piled in stacks four high on wooden pallets. The stacks are unsupported, and several are leaning over. At least half the drums are in a terrible state — crushed, burst, rusty and old. Many are leaking.

Drums containing liquid chemicals are swelling under pressure as the fluids vaporise in the tropical heat. Large numbers hold volatile solvents with a low flash point. Some "smoke" on exposure to air. There is a very real risk of a spontaneous fire or explosion engulfing the site.

## Toxic waste dumping

Koko village is some 200 metres away. The closest building is the school. In the increasingly likely event of a fire, highly toxic and carcinogenic smoke would spread over a wide area.

Despite their international toxic hazard-warning labels, with skull and crossbone symbols, several drums have been emptied and carried away as useful storage containers by local people.

The owner of the compound, Mr Sunday Nana, and his family live in a house less than five metres from the nearest stack of drums. They eat cassava grown inside the fence. From their porch, you can hear the drums "popping" in the heat and smell acrid vapours wafting over.

The Koko wastes arrived in five shipments from Pisa between August 1987 and May 1988. They were smuggled into Nigeria by an Italian director, Gianfranco Raffaelli, of the Iruekpen Construction Company using forged Italian cargo clearance papers and Nigerian import permits.

Koko port officials were reportedly bribed to turn a blind eye. The Nigerian Federal Military Government first learnt of the dump from a dossier of Press clippings sent by Nigerian students studying in Italy.

To the fury of the Nigerian Government, which has been instrumental in persuading African nations to unite against toxic waste dumping, the unauthorised tip in their own backyard is embarrassing evidence of the difficulties of controlling the toxic trade between the North and South.

Subsequent investigations revealed that some of the wastes had arrived via neighbouring Benin. Ear-

lier this year, Nigeria issued strong warnings to Benin over an agreement between President Mathieu Kerekou and France to bury nuclear waste near Abomey, some 160km north-west of Lagos.

Suspecting the worst, the Nigerian Government contacted the US Environmental Protection Agency and Friends of the Earth to send experts capable of independently assessing the risks.

Fortunately sophisticated monitors only registered normal background radiation levels. But preliminary sampling confirms that the wastes include some of the most difficult to handle — highly inflammable chemicals, corrosive toxins and carcinogens like polychlorinated biphenyls (PCBs).

The site itself and the drums are totally unsuitable for storing industrial toxins. The leaking drums have contaminated the soil, and most likely ground water supplies and the nearby river. Cleaning up the site and safely disposing of the wastes will take up to six months and cost millions of pounds.

The contents of thousands of damaged drums must be analysed and repacked before shipment back to Europe.

Extensive environmental and human health monitoring must be carried out. Nigeria has neither the experienced waste management teams nor technical facilities, like high temperature incinerators, to do this. Understandably, the Government is adamant that those responsible should foot the bill.

## Lucrative contracts

At the last meeting of the Organisation of African Unity (OAU), held in Addis Ababa in May, President Babangida of Nigeria declared that "no Government, no matter the financial inducement, has the right to mortgage the destiny of future generations of African children" by accepting toxic waste imports.

Although delegates passed a resolution against dumping, calling the trade "a crime against Africa", at least 10 African countries had already received shipments or signed contracts to do so.

No one is sure how much waste is involved. But recent deals between West African nations and Europe and North America give some idea of the scale of the problem (see above).

According to the United Nations Environment Programme (UNEP), these are "only the tip of the iceberg." What is certain is that developing countries lack the technical means and managerial experience either to store or dispose of such wastes safely. — *The Guardian*



Tropical rubbish dump ... environmental experts inspect the Koko site

## The West African trade in hazardous waste

### Senegal

Negotiating for unspecified amounts of unspecified wastes for landfill disposal at site 40 km north of Dakar.

### Guinea

Accepted 15,000 tonnes of incinerator ash from Philadelphia, U.S. and Norway. Dumped on Kassa Island.

### Benin

Contracted to dispose of 1.5 million tonnes of industrial wastes from US and Europe per year. Also takes radioactive wastes from France for landfill.

### Nigeria

3,800 tonnes of mixed chemical and industrial wastes dumped illegally at Koko, from Europe.

### Equatorial Guinea

Accepted 2 million tonnes of mixed chemical wastes from Europe for landfill on Annobon Island.

### Gabon

Agreed to take unspecified quantities of uranium mining wastes from Colorado, US, in 1987.

### Congo

Contracted to take 1 million tonnes of solvents and chemical wastes from the US and Europe between June 1988 and May 1989. Recently broke off agreement to take further 1 million tonnes from US,

### Guinea-Bissau

Contracted 15 million tonnes of industrial and chemical wastes from the UK, Switzerland, and US over 5 years, for landfill.

# Poisoning the Earth

By MAREK MAYER

**LONDON:** Within Western Europe and North America, "a cargo of hazardous wastes crosses a national frontier more than once every five minutes, 24 hours a day, 365 days per year."

That, according to the Organisation for Economic Co-operation and Development, was the situation five years ago. In total, some 2.3 million tonnes of hazardous waste were transported for disposal in another country in 1983, representing a virtually doubling of the trade just one year earlier.

Reliable statistics on the current scale of the trade are not available, but three things are certain. First, transfrontier shipments of waste have continued to grow apace since the early 1980s.

Second, countries are no longer looking overseas for disposal facilities simply for hazardous waste, but for very large quantities of everything from ordinary domestic refuse to incinerator ash and polluted soil.

And third, the trade is now extending its tentacles well beyond the confines of the industrialised world, as waste producers sense the prospect of huge savings — and waste brokers huge profits — by finding cheap dumping outlets in the Third World.

Part of this trade can be ascribed to sound motives. Wastes such as polychlorinated biphenyls — transformer fluids which have now been banned because of their toxicity and persistence in the environment — have for years been finding their way from all over Europe, and from as far afield as Australia, to two hazardous waste incinerators in Britain. High temperature incineration is currently the only safe disposal option for these materials, but many countries lack such facilities.

But the trade has mushroomed in recent years mostly for other, less palatable reasons, and is bringing some nasty environmental hazards in its wake. By far the most important factor has been the increasing divergence in disposal prices between countries, in turn reflecting the growing gap in waste disposal standards between the most advanced and the rest.

Cheap bulk transport has made it possible for entrepreneurs to exploit these differentials, making it economic for them to cart wastes

over huge distances and still come away with a handsome profit.

The 3,500 tonnes of European chemical waste dumped in recent months in Koko, Nigeria, illustrate the margins involved.

The materials which found their way to Koko would cost between £200 (\$1,000) and £1,000 per tonne to dispose of by high-temperature incineration in Europe. Dumped in Nigeria, the only disposal charge was a payment of £60 per month to a local landowner, though no doubt some further fees of the palm-greasing kind were incurred.

Equally powerful economic forces are at work in the US. There, some 2,700 landfills have been closed within the past five years, the vast majority of them due to tightening environmental laws.

Replacements have proved difficult to find, and as a result the east coast States in particular are up against a growing waste disposal crisis.

While disposal costs for domestic refuse in the US are running at an average of US\$14 (\$35) per tonne, many districts in the New York area are now paying more than US\$100 per tonne to have their rubbish carted several hundred kilometres to landfills inland.

Within the past few months, however, a solution has been sought in the east. Eyeing the attractively low landfill charges of £5 per tonne or less in Britain, a British company, Power, Water & Waste, has proposed to ship more than two million tonnes of domestic waste annually across the Atlantic into Cornwall and Cheshire.

The quantity of waste involved — equivalent to 10 per cent of all the refuse generated each year in the whole of Britain — is phenomenal, and would bring with it potential hazards such as the creation of explosive methane gas from the decomposing rubbish, and the possible importation of plant and animal pests and disease.

Many US municipalities, squeezed by the growing shortage of landfill capacity, have looked to

incineration as the alternative solution. Mass burning of this kind, however, leaves an ash residue equivalent to about 30 per cent of the original waste volume.

The residue, unfortunately, is sometimes so heavily contaminated with metals and dioxins that it qualifies as a hazardous waste.

In some parts of the US disposal capacity is not available even for this rendered down waste.

The city of Philadelphia, increasingly desperate as ash from one of its municipal incinerators grew into a 250,000-tonne stockpile, passed 13,500 tonnes of the material to a waste disposal firm in August 1986, which in turn placed it on a Liberian-registered vessel, the *Khian Sea*. Originally destined for dumping in the Bahamas, the cargo was refused entry not only there but in Bermuda, Honduras, the Dominican Republic and, across the Atlantic, in Guinea-Bissau.

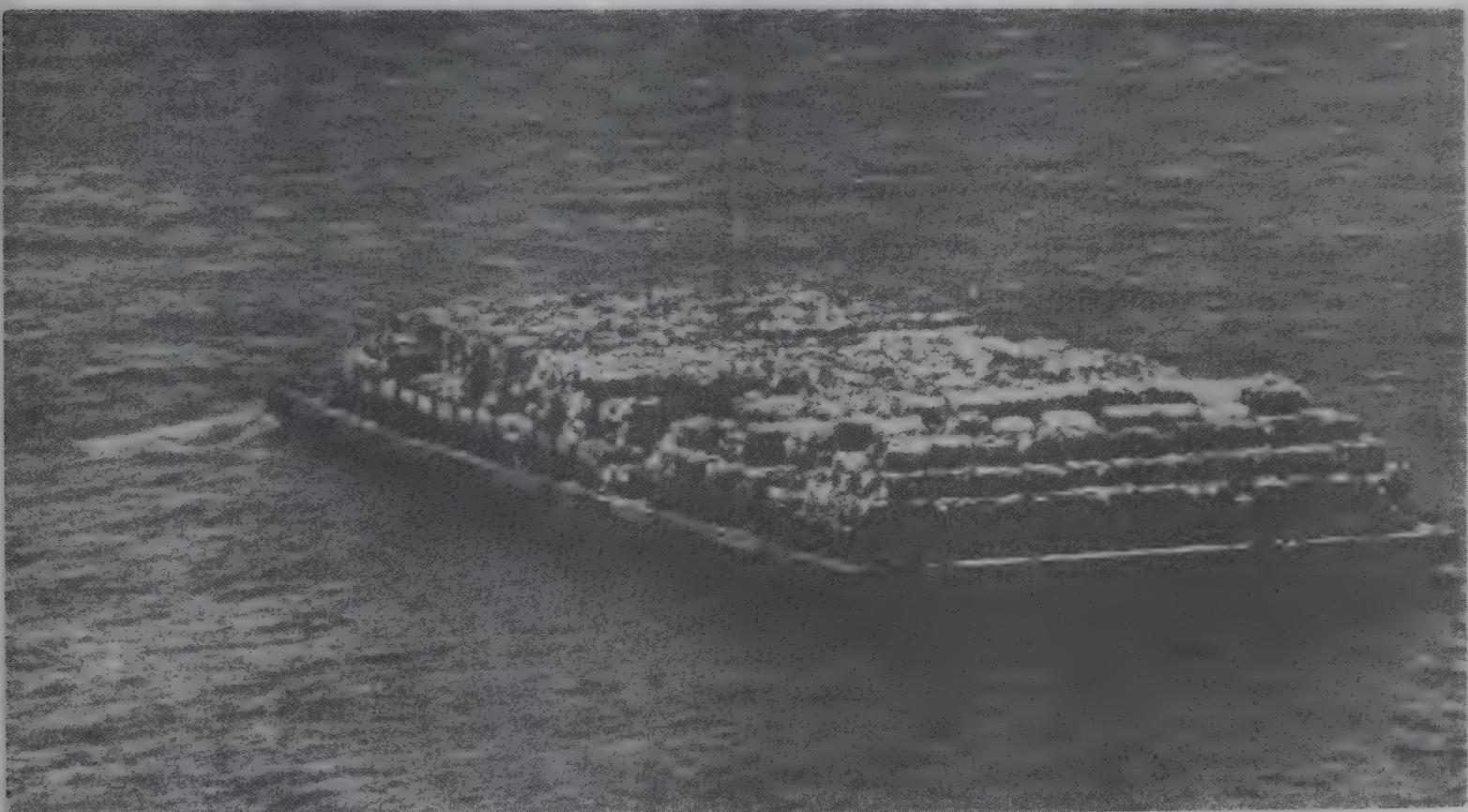
Some 3,000 tonnes of the cargo were eventually dumped in Haiti last January, but when the authorities sought to have the waste reloaded the *Khian Sea* made its escape in the middle of the night. Since then, the vessel has returned to Philadelphia, and sailed out again with its cargo to an unknown destination.

The peregrinations of this and other vessels from both Europe and the US around west Africa and Latin America suggest that some Third World governments are getting wise to the idea that their countries are being exploited as dumping grounds. And work is under way under the aegis of the UN Environment Programme to prepare a global convention which will help to regulate the trade.

The pressures for globe-trotting of this kind are, however, enormous, and will intensify as stricter waste management laws in parts of the Western world outpace the creation of new, more sophisticated disposal capacity.

Governments in countries such as the US, the Netherlands, Switzerland and West Germany which have led the way in protecting their own populations from the hazards of waste dumping, will soon have to consider whether in doing so they have helped merely to foist the problem on to less fortunate people. — The Guardian

# NOT WANTED ANYWHERE



This barge of rubbish has been turned away by 3 countries and 5 states. It has travelled 9,600 km in search of a dumping ground.

The trip started from New York and finally arrived at Brooklyn's Ravesend Bay where a

Supreme Court judge allowed docking, but a Municipal order barred unloading.

The barge now oozes liquid waste while awaiting further instruction.

# US exports hazardous wastes to the Third World\*

By David Weir and  
Andrew Porterfield

SEVEN YEARS AGO we researched and wrote a book (*Circle of Poison: Pesticides and People in a Hungry World* by David Weir and Mark Schapiro) about the exports of hazardous pesticides to the Third World. Partly as an extension of that work, we commenced a new study of the movement of hazardous wastes across U.S. borders to underdeveloped countries. Our investigation started when an official of the North Carolina Department of Agriculture, who had read *Circle of Poison* called to tell us about a strange character named Colbert who was offering to buy the state's stocks of banned and surplus pesticides for a dollar a barrel and ship them to Central and South America.

Upon following this "lead," we discovered that two New York-based men, the Colbert brothers, had amassed a huge volume of hazardous wastes of various kinds, including outdated pesticides, industrial chemicals, and other items from various sources in the eastern U.S. Until 1986, when a Federal court in New York sentenced them to 13 years in jail for fraudulent business practices, Jack and Charles

Colbert were making big money as toxic waste exporters. They had amassed huge volumes of explosive and poisonous wastes in 20 warehouses over primarily the eastern half of the country, from Texas to South Carolina to the Canadian border. Many shipments were sent overseas, to India, South Korea, Nigeria and Zimbabwe. Federal and New Jersey State prosecutors were eventually able to stop the Colberts because they falsely labeled their waste products as pure chemicals, to mislead their overseas buyers.

The Colberts purchased their wastes from the Navy, the Army, the Defense Department and the Agriculture Department. They also bought lead-tainted engraving paper from the Treasury Department's Bureau of Engraving. Fortunately, the paper was never sold. Just after New Jersey authorities seized one of the Colberts' warehouses in Newark, "Some guy came by who wanted to buy the paper for an African country," says Bruce Comfort, an investigator for the New Jersey Department of Environmental Protection. "He was going to have it sold to Africa as toilet paper. He didn't know it was contaminated."

\* Copyright: Center for Investigative Reporting 1987

The brothers' scheme came to the attention of authorities when they relabeled a shipment of wastes as pure dry cleaning solvent and sold it to a company in Zimbabwe, which purchased the shipment with funds provided by the U.S. Agency for International Development (AID). The Colbarts were arrested, tried and convicted for their actions in the case and are now in prison. Investigators from federal and state agencies, upon looking into their warehouses, have discovered that perhaps half of the waste products they were exporting came from the U.S. government and state governments themselves; the rest from private industry.

Under U.S. law the generator or producer of toxic wastes has the ultimate responsibility for seeing that the waste products are disposed of properly and legally. But the government does not prosecute itself in these matters, so there have been no actions against any of the government agencies that sold their wastes to the Colbarts.

What is curious about the case is that our original source in North Carolina said that the Colbarts were extremely open about their export plans, even bragging about how they were so easily fooling the Third World buyers. It was no secret, apparently, what they were up to, which leads us to conclude that the U.S. officials involved did not *want* to know where their toxic wastes were going -- or more precisely, they did not want to do anything to stop their waste products from going there. Only when the embarrassing elements of U.S. government financing (through AID) of the purchase of such wastes by the company in Zimbabwe made the issue an international scandal of sorts did the authorities act to stop the Colbarts from their illegal schemes.

Even then, very little publicity was generated by the case, and no mention was made of the government's role in producing the wastes in question. According to one source of ours, the Colbarts remain actively running their business from prison, using jail phones to do the dirty work they used to do on the outside. They are currently appealing their convictions.

The Colbarts' scheme wasn't an isolated case. In 1984, American Electric, a Jacksonville, Florida, company run by businessman Maxwell Cobb, tried to sell PCB-laden wastes to Honduras. Much of Cobb's material was acquired under a large contract with the Defense Department to handle wastes from military bases up and down the East Coast. According to Bob Yerkes, an Assistant U.S. Attorney who helped prosecute Cobb, "The problem was that there was not enough evidence. The government records were not precise. A jury acquitted him." (Cobb went to jail anyway, on a drug conviction.)

During our investigations, we found evidence of many shady operators like the Colbert brothers and Cobb exporting hazardous wastes to underdeveloped countries. We called this group a "shadowy industry" because documenting their activities often seemed like chasing a shadow -- when you get close to it, it moves away or disappears, often reappearing somewhere else -- or in the case of these shadow companies, under a new name.

We found cases of exports to all underdeveloped areas of the globe by U.S. brokers. In some cases huge incinerator projects are planned for remote Pacific islands, or outlying areas of the Philippines not under central government control. Rumours of major

dumps on islands in the Caribbean and in Mexico persist. Deals involving associates of deposed Philippines dictator Ferdinand Marcos and other controversial international figures have been reported.

As with everything in this business, the deals tend to be quiet, behind-the-scenes negotiations, rarely subject to scrutiny by the public and the press. Once a deal comes out into the open, it often falls apart or has to be delayed until the furor dies down.

And U.S. government agencies that are supposed to enforce the laws regulating such shipments lack the money and the personnel to do the job. The role of the U.S. government in the growing export business is a complex one. On the one hand, through a badly understaffed and underfinanced Environmental Protection Agency (EPA), the government is charged with regulating most toxic waste exports under a set of complicated laws.

But on the other hand, the government itself is responsible for generating many of the toxic wastes that need to be disposed of. One large illegal operation broken up by law enforcement officials in 1986 was obtaining more than half its toxic wastes from various branches of the Federal government, mainly the military.

The material that is being exported includes heavy metal residues and chemical-contaminated wastes, pharmaceutical refuse, and municipal sewage sludge and incinerator ash. The risks involved for countries that accept the wastes range from contamination of groundwater and crops to birth defects and cancer.

Traditionally, the majority of U.S. toxic waste exports have gone to Canada, where regulations are less

stringent than in the United States. Under an agreement between the two countries, massive amounts of toxic wastes are exported to a landfill site in Quebec Province and an incinerator in Ontario. But the most abrupt increase is in shipments to the Third World, where regulations are either nonexistent or sketchily enforced. The crucial difference, however, is that waste exports to Canada are legal and above-board. The rising tide of exports to the Third World cannot easily be documented, for it is frequently concealed. However, using court records, interviews and documents obtained under the Freedom of Information Act, we have been able to piece together a number of previously unreported examples of the shadowy trade in hazardous wastes. Some have come to light because the companies concerned were convicted of illegal activity; others because we managed to obtain export authorization records from the EPA and still others because records show that the foreign government involved has refused to accept the wastes.

The sources also demonstrate the degree to which U.S. government agencies are involved in the hazardous waste export trade. U.S. officials who are aware of the sensitive legal and foreign policy questions involved seem reluctant to crack down on illegal dumpers, although recently some of the most blatant offenders have been prosecuted.

Underlying the search for new overseas markets is an explosion in the volume of recorded hazardous wastes being produced in the United States and the growing crisis within the country over how to dispose of the wastes. According to the General Accounting Office, the amount rose from about 9 million metric tons in 1970 to at

least 247 million in 1984 over a 25-fold increase. Other experts place the current figure close to 400 million metric tons — or ten pounds per person per day. Western Europe and Japan produce much less per capita, apparently because of more efficient production processes and a greater awareness of the limits of landfill disposal space. All of Western Europe, in fact, generates only an estimated 30 million to 40 million metric tons of hazardous wastes annually.

The cost of disposing of U.S. wastes has also risen dramatically. In 1976, disposal cost \$10 a ton; today the figure is between \$60 and \$140 a ton, in some cases even higher.

As scientists discover the environmental and public-health problems created by past disposal practices, landfills across the United States have been forced to close. Major concerns include the contamination of groundwater by hazardous chemicals that leach from dump sites and the creation of dangerous breakdown products, such as highly toxic dioxins, during incineration. Within a decade, according to the EPA, more than half the states will have completely exhausted their landfill capacity and be unable to accept hazardous wastes, adding further to the cost of transport and disposal.

Since 1980, companies that intend to export hazardous wastes have been required by the Resource Conservation Recovery Act to send notices to the EPA's Office of International Activities, and since November 1986 they have had to show they have the permission of the receiving country. The number of shipments thus documented has risen from just thirty in 1980 to more than 400 in 1986. (More than half of those went to Canada.)

Although the number of notices for shipments to Third World countries has jumped sharply, from four in 1984 to nineteen in 1986, those figures do not tell the whole story. They do not include, for example, wastes not yet officially classified as hazardous; according to a recent study by the GAO, the "EPA does not know whether it is controlling 90 percent of the existing waste or 10 percent. Likewise it does not know if it is controlling the wastes that are most hazardous." There is also the problem of overlapping jurisdictions within the EPA. Export of certain chemicals, like polychlorinated biphenals (PCBs), is forbidden by the Toxic Substances Control Act and is regulated by the EPA's toxic substances division, which does not handle wastes.

Even some of the exports that appear to fall under the EPA's purview are escaping detection. According to one knowledgeable EPA official, who did not wish to be named, "Many exporters don't bother to give notice to the agency because there isn't any enforcement." Gary Steakley, an EPA enforcement official, added, "We have been promised funding increases for the last few years for enforcement of toxic wastes but have received nothing. Regulations (don't stop) supplies of illegal drugs. Why should they stop dumping of toxic wastes?" By comparing Customs Service records at various U.S. ports with the notices sent to the EPA, says one well-placed source, "EPA auditors have detected many more shipments than were reported to the agency. The amount of trade is as much as eight times more. That's not including smugglers who elude customs. I think many countries are having it sneaked in." (This is sometimes with the complicity of officials in those countries.)

The key U.S. government officials responsible for monitoring the burgeoning hazardous waste traffic claim they are powerless to stop even a dangerous export if the host country agrees to accept the shipment. "Under the Federal system, we only have control over what's in the country," says Wendy Grieder, an official in the EPA's Office of International Activities. "Once it leaves, we can't do anything about it. And their destinations don't often regulate as tightly (as does the United States), even Canada. Once it gets there, we don't know what happens to it. That's why we had so many exports."

In addition to the EPA, the Commerce Department monitors some hazardous waste exports. Under the 1977 Export Administration Act, the department issues permits for exports of strategic metals that are contained in ash and other factory residues. In the process the department gathers information about the overseas movement of these residues. Since 1980, 35 of the 75 approved destinations for these exports have been underdeveloped nations, including the Philippines, Mexico, and many in Central America and the Middle East. But the Commerce Department does not monitor what happens to the mountains of waste materials, which may contain lead, mercury and other dangerous substances, after the tiny fractions of usable metals have been extracted. This is partly because the intent of the 1977 law was to restrict the export of strategic goods, not to assess the health and environmental hazards involved. "After (the waste material) gets there, the country can do whatever it wants with it," said a department official who requested anonymity to avoid being fired. "I assume it gets tossed out."

Of course, simply "tossing out" hazardous wastes can cause severe public-health problems. In the Dominican Republic, says one expert, wastes containing antibiotics and fish oil were imported for use as cattle feed and fertilizer from a U.S.-based Abbott Laboratories' facility in Puerto Rico, where pharmaceutical dumps are full. In 1985, one animal died from the mixture. According to Dr Antonio Thomen, director of the Dominican Institute for Bioconservation, ingestion by humans can cause hormonal disorders, birth defects and severe intestinal illnesses, particularly among children. The Dominican Congress has now passed a law prohibiting the import of pharmaceutical wastes as a human-health hazard.

EPA files also contain records of other shipments that the agency barred from export after the importing countries refused to accept them. In 1985 the Costa Rican government denied entry to a shipment of 205 cylinders of poisonous, corrosive gases after asking EPA officials for information about the materials involved. Eco-Therm, a California transport company hired by T R W Inc. of Redondo Beach, California, to make the shipment then sued several EPA officials for obstructing trade, but the case was dismissed early last year in Federal court in Washington for lack of evidence.

In another incident, when the Bergsoe Metal Corporation of St. Helens, Oregon, tried to send 700 metric tons of crushed battery plates containing lead to the Kwang Shin Industrial Company of South Korea, the Korean government told the State Department in a telegram that it was opposed to the import of "such harmful waste." The EPA rescinded its export approval. Bergsoe then attempted to get permis-

sion to ship the waste to three successive companies in Taiwan, but that government also intervened and the EPA could not approve the deal.

In addition to individual shipments of waste products, at least two American companies have proposed multimillion-dollar deals to build incinerators in the South Pacific to process U.S. wastes. L P T, a company with offices in American Samoa and California, is seeking approval to build an incinerator in American Samoa to burn U.S. wastes and export the ash to the Philippines, where it would be used as landfill. The Samoan government has not given its approval according to the EPA, and the Philippine government asserts that it has a policy of not accepting hazardous wastes from anyone. However, in April, according to local newspaper reports, a woman named Elvira Medua Patel, who said she was a special envoy of President Corazon Aquino, showed up in American Samoa, saying Aquino wanted the waste shipments to go to the Philippines and was even willing to have the incinerator built there, if American Samoa turned down L P T's proposal. The Philippine government denies that it offered any such deal.

Also, a company named Western Pacific Waste Repositories, based in Carson City, Nevada, is proposing to build a hazardous waste storage and treatment plant on Erikub atoll, an uninhabited area of the Marshall Islands. Company president Dennis Capalia proposes to use the atoll to store wastes for the next 100 years. In return, it will make cash payments and promote the development of nearby Wotje atoll, whose residents now use Erikub to make copra and hunt for marine life.

Major U.S. cities, as well as Federal agencies, have joined the waste export bandwagon, sometimes with the approval of the State Department. Cities like Philadelphia, Boston, New York, Los Angeles, Hartford, and Washington, D.C. are negotiating deals directly with Third World countries to accept their municipal sludge or incinerator ash on a long-term contract basis.

In 1987, the public and press became fascinated by the so-called "garbage barge", which sailed the seas for months loaded with garbage from Long Island, New York, because nobody would allow it into their port. Attempts to sell the waste to various Central American countries failed, and the barge eventually had to return to where it came from. Later the same year, we learned of the existence of another such barge, this one apparently loaded with more dangerous material than the Long Island barge contained. For the preceding 15 months, according to a report from the Inspector General of the EPA, a barge loaded with 15,000 tons of incinerator ash has been at sea. The ash comes from the city of Philadelphia, where EPA has measured concentrations of dioxins that, according to the report, present "a significant potential danger to human health and the environment." The report says the dioxin levels exceed some of those at Times Beach, Missouri, in 1983 -- the community bought up and closed down by the government in order to protect residents from dioxin contamination. Many other harmful materials were also identified by EPA in the ash, including lead, cadmium, and benzene.

The toxic ash on this barge was originally scheduled to be dumped in the Bahamas, in 1986, but was rejected

by the government there. After that, the barge stayed at sea, wandering, searching for a Caribbean country willing to accept its load.

When we located the barge in November 1987, it was anchored off the coast of Panama, which was in the middle of finalizing a deal with Philadelphia to accept 250,000 tons of incinerator ash over the coming year for use as a roadbed through a wetlands area.

If this deal succeeds, Philadelphia, which has faced a rise in waste disposal costs from \$20 to \$90 a ton since 1980, intends to transport as much as 600,000 tons of ash residue per year from its municipal incinerator to Panama -- for a staggering 7 million tons apparently destined for one roadbed project alone! And this will cost Philadelphia taxpayers only \$37.25 a ton.

This deal involved a private U.S. company owned by a Norwegian firm. The Norwegian parent is planning a development project along the Panama coast, including a resort hotel, and needs a road system to carry tourists to the site. The area for the road is a wetlands district with extensive mangrove forests. Mangrove areas are of extreme international concern because they are a critical ecological link as breeding grounds for all types of marine life -- and because they are being destroyed at a disastrous rate in tropical countries. They are fragile, beautiful, endangered ecosystems.

One of the reasons often given for the willingness of some Third World officials to import toxic wastes is that the deals can be lucrative ways of easing their terrible debt burden. Indeed, multilateral aid organizations are pressuring Third World governments to ease their import restrictions as part of the

pressure the West is placing on opening up markets and stimulating economic growth.

Ironically, the area of Panama where this road was to be built with Philadelphia's incinerator ash is one of the most important breeding grounds for the white shrimp, which is Panama's chief food export. The likelihood that dioxins would leach from the roadbed in the unstable wetlands area and bioaccumulate in shrimp later exported to the U.S. was expressly noted by EPA in its report on the deal. Experts consulted by EPA stated that not only would contaminants of the ash run off into the surrounding wetlands, portions of the road itself would almost certainly wash away periodically, discharging huge insults of dioxins and heavy metals into the fragile ecosystem. In fact, roads are said to commonly wash away in the area.

High officials of EPA declined to act on the recommendation of the Inspector General for "immediate action" to prevent the deal. But when news of the matter broke into the media, we were told that the deal was going to fall through, possibly for good, possibly to be revived later.

Philadelphia has also been trying to find a Third World destination for its municipal sewage sludge, which has historically had a high metals content and has been the subject of a lawsuit against the city by the EPA and environmentalists for violating Federal standards.

Honduras, the first country approached by Philadelphia, rejected the sludge proposal. The next candidate was Guatemala, which may also turn down the waste despite the initial enthusiasm of President Vinicio Cerezo, who saw the deal as a valuable source

of foreign exchange and the approval of the State Department. "We have reviewed the proposal and have no objections," said a memorandum from the U.S. Embassy in Guatemala City to Washington. "One can imagine that shipping sewage sludge ... will incite some unfavourable press in Guatemala. With this caveat, we have no problem."

Philadelphia's export plans may go through, but Applied Recovery Technologies, the company planning to ship the wastes, has since approached other cities. U.S. sludge may also end up in the tiny British Caribbean colony of the Turks and Caicos Islands, which proposes to use it as fertilizer. In a letter to Henry Valentino, president of Applied Recovery Technologies, State Department coordinator for Caribbean affairs John Upston wrote, "This project represents a breakthrough in a ... way to deal with a growing problem for our cities. At the same time it helps in a major way the economy of a small friendly country in the Caribbean."

A differing view was expressed by an official of an overseas environmental organization, who asked not to be named for fear that the AID would cut off his funding. "I am concerned that if U.S. people think of us as their backyard, they can also think of us as their outhouse. Disposal of wastes on land can have very serious consequences. Toxic materials can be taken up in root systems which can grow in sludge used on land. These materials could end up in fruits and vegetables or in animals."

"The Caribbean is a big target area," says Dr Noel Brown of the United Nations Environmental Programme in New York. "It's cheaper to barge it down there than to move it overland forty miles. We don't have an international policy on wastes. We need one now."

In the United States, the pressure to ship wastes overseas is growing. Representative James Florio, who conducted hearings on such exports in 1983, says, "Like water running downhill, hazardous wastes invariably will be disposed of along the path of least resistance and least expense. Conditions are ripe for finding 'safe havens' for hazardous wastes around the globe."

Many experts see the trend as part of an old American habit of putting undesirable elements out of sight and out of mind. "To push things out beyond its borders, that is a traditional American philosophy," notes Nikolai Zaitsev of the United Nations' Center on Transnational Corporations.

Despite the growing problem, the Reagan Administration has shown little concern. Grieder of the EPA defends the agency's "hands off" policy on exports to the underdeveloped parts of the world. "At EPA, we're not in a position to say, 'That's a bad deal,' or 'They don't know what they're doing.' If the receiving country says yes, there's nothing we can do about the shipments. Although morally it's probably a good idea, as an agency we can't do it. What if we did stop a shipment? What if the government makes a mistake and the company and the shipment are legitimate?"

But some officials worry about the possibility of a chemical waste disaster occurring as a result of the U.S. waste export boom. "If I were the U.S. Secretary of State," said Senator George Mitchell in 1984, "I would want to be sure that no American ally or trading partner is saddled with U.S. wastes it does not want or does not have the capacity to handle in an environmentally sound manner."

There is even the possibility that exported wastes may return to haunt

the United States in a more direct way. Certainly the danger is apparent to Grieder. "It hasn't happened yet, but it could happen," she says. "It's possible that we could send sludge to the Caribbean and they might use it on, say, spinach or other vegetables. We would get it back here, and the FDA would say, 'Hey, wait, you've got too much cadmium in those vegetables.'" Since the Food and Drug Administration checks only a small portion of foods and vegetables that come into the United States, exported hazardous wastes could easily end up on our dinner table.

Meanwhile, overseas pressure to prevent the wholesale dumping of U.S. wastes is building despite U.S. government encouragement and the large sums debt-ridden Third World states can make from such deals. "Governments could fall because of this," says the United Nations' Brown. "It would be worse than sending guns, because it affects everyone."

Where will the next toxic export scandal appear? And how many have escaped our attention already? How many unauthorized toxic waste dumps already exist on remote islands or in out-of-way districts of the underdeveloped world? The answers are unknown, but several experts we interviewed believe that policy makers and the public will not wake up to the seriousness of this situation until they perceive a direct threat to themselves.

In the case of *Circle of Poison* our work documenting the poisonings of hundreds of thousands of people in the Third World from pesticides produced in the U.S. and Europe received little notice until we pointed out that significant amounts of our food imports -- coffee, tea, fruits, vegetables, and meat

-- are contaminated with residues of pesticides, including those like DDT that have been banned at home.

This is why we called it the "circle" of poison, because what goes around, comes around.

As in the case of Panama's white shrimp exports, there is a significant danger that our toxic waste exports will not be used or disposed of in an ecologically sound manner in Third World countries that supply us with food products. Therefore, perhaps we need to speak about the dangers of a Circle of Garbage.

One would wish that human beings had evolved to the point where we were able to act to prevent problems that affect everybody without waiting until we are afraid only of what might happen to us personally. But apparently, in the case of toxic waste exports from the U.S., we have not yet reached that point.

But we do not want to end on such a depressing note, because all of us are already aware of the seriousness of the ecological threat posed by hazardous waste disposal practices, and by other environmentally unsound activities.

As the Brundtland Commission report so eloquently pointed out in 1987, it is only in our lifetimes that humankind has seen photographs of our planet from outer space -- for the very first time, undisputable visual proof that our globe is a "fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery and soils." The report speculates that this vision of ourselves, on one small, vulnerable planet tied together with

the web of plants and animals that sustains us, may eventually be recognized as a major turning point in the evolution of human thought.

If that is the case, our search for solutions is just getting underway, and in order to find a path to the future we need to believe in the future. Solutions to the toxic waste export problem are fairly simple -- impose new restrictions on the production of hazardous waste in the first place. American companies are far more wasteful than European companies, for example, so we can adopt stricter manufacturing standards as a first step toward cutting down the generation of wastes right at the point of production.

But this kind of change requires political will, which in turn requires debates in Congresses and Parliaments, political leaders willing to speak out, a vigorous press and NGO community

willing to alert the public to the urgent need to get involved in the search for solutions to our problems.

#### Footnote

\* This combines a paper presented by David Weir at the *Seminar on Hazardous Wastes : The Unmet Challenge* held at Brussels in December 1987, and an article jointly written by Weir and Andrew Porterfield (published in *The Nation* 3 October 1987). David Weir and Andrew Porterfield are journalists at the Center for Investigative Reporting in the United States. The Center for Investigative Reporting is a non-profit, tax-exempt news organization, established in 1977, that produces in-depth reports in the form of books, articles for magazines, newspapers, and news services, and television and radio reports on issues of public concern.



# 'Keep the Pacific nuclear free'

South Pacific islanders fight plans to make their region a nuclear waste bin

By James Branch

GOVERNMENT and citizen groups in the Pacific Islands are waging a battle to prevent their ocean from becoming a dumping ground for nuclear waste. Both Japan and the United States have plans to dump radioactive waste in the South Pacific, and would have already begun if not for the outcry from citizen action groups and some governments in the region.

In 1982 the US Department of Navy announced that it would sink at least a hundred obsolete nuclear submarines in the Pacific over the next three decades. Each vessel reactor contains 62,000 curies of residual radioactivity, or nearly equal the entire amount of radioactive material already dumped into the ocean by the US.

In 1979 the Japanese government announced an 'experiment' to dump 10,000 drums of low-level nuclear waste at a site just north of the Mariana islands. Then if the experiment was successful, Japan would begin the full scale dumping of up to 100,000 curies a year at the same site.

In 1980 the US and Japan launched a joint feasibility study for the storage of 10,000 tons of high-level spent

nuclear fuel from reactors in Japan, Taiwan and South Korea in the US Trust Territories in the Pacific. The results have never been announced.

All three of these swords still hang over the Pacific islanders, although public protest has so far prevented any of them from falling. But the pressures to dump are increasing as the amount of nuclear waste in the industrialised countries accumulates. Japan, with 25 reactors and another 58 on the drawing board, presently stores its high-level waste in temporary sites while the government looks for a permanent solution.

In addition, the low-level waste generated by these reactors is stored in metal containers. Japan already has 460,000 containers and the mountain is growing by 60,000 to 70,000 annually.

The US, with more than 70 reactors, has even bigger problems. Ocean dumping of high-level waste is presently banned under US law. But the US has spent more than US\$30 million researching sea-bed disposal and the National Advisory Committee on Oceans and the Atmosphere has a report for

Congress recommending that the ban be lifted.

Even if Congress disagrees, there is a way around the law. One dumping technique being researched involves sinking waste-loaded projectiles 30 to 100 metres into the ocean floor. Since they are then *under* the floor, the US National Oceanic and Atmospheric Administration argues, this is not ocean dumping.

It was the Japanese threat to the Marianas which first provoked the determined opposition of the Pacific islanders. The Northern Marianas government hired Dr W Jackson Davis, who had studied the effects of nuclear dumping off the Californian coast, to look at the Japanese proposal. His report pinpointed seven major errors in the safety assessment prepared by Japan's Science and Technology Agency (STA) and concluded that the dump would endanger the health of both the islanders and the Japanese.

Many island parliaments passed resolutions opposing the plan and more than 70 government and citizen action groups throughout the Pacific Basin signed a formal anti-dumping petition to the STA. The row forced Japan to suspend its project temporarily and as protests spread within Japan itself as well as in Australia, Prime Minister Nakasone has continued to announce postponements.

But Japan seems determined to go ahead unless actually prevented by international law. The STA has continued to insist that the project is safe. You can 'embrace and sleep in the same bed' with Japan's drums of nuclear waste without danger, declared Ichiro Nakagawa, STA's director.

'We would like to proceed with nuclear waste dumping as soon as

possible, since the safety assessment has already been completed as far as Japan is concerned,' an STA spokesman told a delegation of petitioners in 1983.

The Pacific Islands' strategy since 1982 has been to try to write a ban on ocean dumping into international law — an effort persistently vetoed by Japan, the United States and Britain. The focus of this diplomatic action is the attempt to set up a Pacific Regional Dumping Convention, which would prohibit dumping in the Pacific.

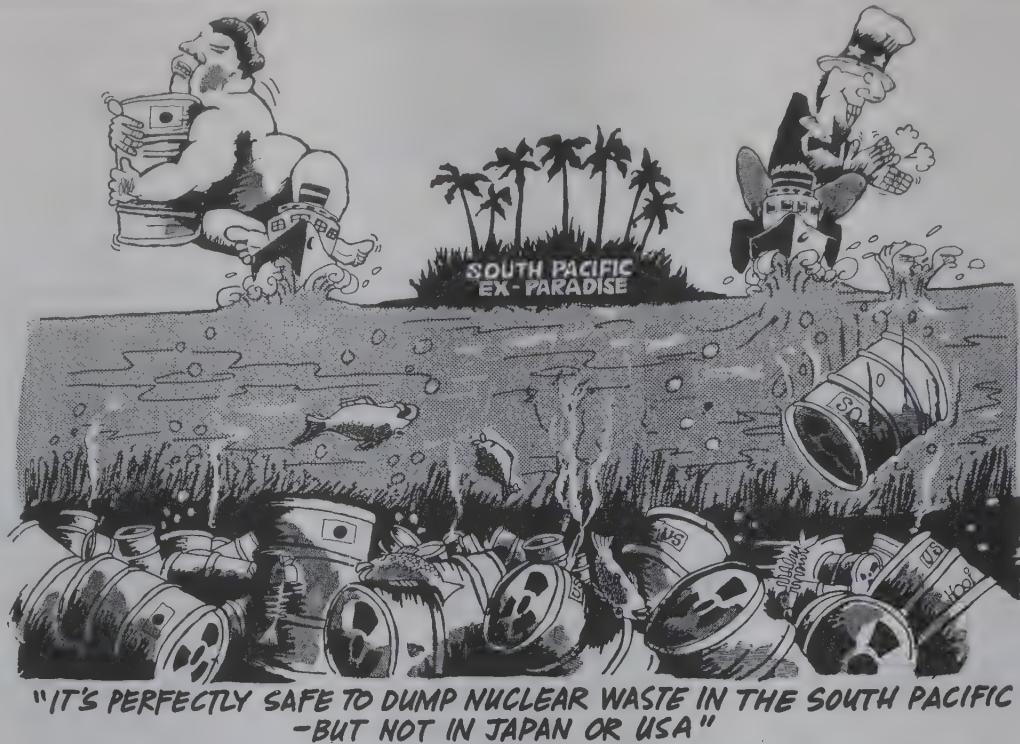
Nuclear dumping is presently controlled by the London Dumping Convention, which does ban the dumping of high-level nuclear waste.

Four meetings have been held so far to draft the Pacific convention and in the process the goal to ban dumping outright has been watered down by the nuclear powers.

For instance, the language of the draft convention was twisted to read that the contracting parties would take measures against pollution in the Pacific 'resulting from the storage and disposal of nuclear waste and the testing of nuclear devices' when in fact it should have called for a prohibition of nuclear waste dumping itself.

In addition, the area to which the convention would apply has been whittled down to 200 nautical miles around each island, which excludes the proposed Japanese dumpsite. To date there is no consensus and the Plenipotentiary convention has not even been scheduled.

The Pacific nations have not been any more successful in changing the rules at the London Dumping Convention. An attempt by Nauru and Kiribati in 1983 to introduce an amendment to



ban all radioactive dumping at sea has been repeatedly postponed. Instead, a non-binding resolution called for a two-year moratorium. Although passed by a 75 per cent margin, the US and Japan voted against it and Britain declared it would ignore it.

There is some cheer in the study by a technical group of the South Pacific Commission which found that exposure to artificial sources of radiation is lower in the South Pacific than in the northern hemisphere. The group also found that the dangers in low-level nuclear waste dumping are minimal. It warned however, that scientific understanding of the ocean is not good enough to make exact predictions. On the question of burying high-level waste beneath the sea floor, the group said that there was not enough data to make any conclusions about safety.

This report backs the position of the STA that its low-level waste dump would be safe. But the feeling among the islanders is that if the waste is so safe, then the Japanese can 'embrace it and take it to bed' themselves.

The South Pacific islanders have in

the past already endured traumatic experiences with the radioactive debris of nuclear testing programmes of the Western powers.

In the 1950s, the United States conducted nuclear weapons testing at the Marshall atolls of Bikini and Enewetak, contaminating once-populated islands.

In the 1946-70 period, the United States dumped 100,000 curies of low level nuclear waste in Pacific ocean sites. The US Environmental Protection Agency found ruptured waste containers and radioactivity above normal levels in the surrounding water and sediments.

In 1981, nuclear waste from the French weapons testing programme washed on to reefs near Moruroa island.

Now the islanders are determined to oppose the plans to treat the Pacific islands as nuclear dumping grounds which would further threaten their environment and health.

'You don't throw the seeds of a poisonous fruit in the yard of your neighbour,' as Palau legislative speaker Tasiwo Nakamura told a group of Japanese scientists in Guam.

James Branch is the Administrator of the Guam Environmental Protection Agency and represents the Guam Government in matters concerning the South Pacific Regional Environmental Program.

# International trade in toxic wastes: Policy and data analysis

By Greenpeace International, June 1988

## POLICY ANALYSIS

PRINCIPLE 21 of the 1972 Declaration of the United Nations Conference on the Human Environment adopted at Stockholm, declares that each state is responsible for ensuring that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of their own national jurisdiction.

In support of this Principle, and the Cairo Guidelines, Greenpeace International calls for a global ban on the transboundary movement of wastes. The basis for this global ban on the transboundary movement of such wastes and waste treatment or storage or disposal facilities is as follows:

- The basic 'need' for export can not be justified in scientific, technical monetary or legal terms.
- Exhaustive scientific studies have shown that all common waste disposal options — landfills, incinerators and deepwell injection facilities release contaminants into the surrounding environment.
- No system of regulations can safe-

guard human health and environmental integrity from wastes moved from one country to another.

- Each shipment of waste from one country to another is a threat to the public health and environmental integrity of the transited and receiving countries.

Thus far, the United Nations Environment Program working group has modeled its efforts after the regulatory systems created in North America and Europe. However, these systems, based on the principle of 'prior informed consent', have done nothing to stem the flow of wastes, often illegal, from North America and Europe to developing countries.

In fact, the rate of the transboundary movement of toxic and hazardous wastes has accelerated during 1987. Further, bureaucratic systems designed to monitor the flow of wastes from industrialized nations appear to be incapable of stopping the proliferation of 'sham recycling' and overtly illegal waste export schemes.

Wastes are not appropriate commodities for trade in the global market-

place. The export of wastes serves as a safety valve for waste generators in industrialized states, where both popular and official recognition of the need for better protection of public health and the environment is leading to accelerating costs for waste disposal.

In many developing nations, the regulatory frameworks and technical infrastructures for appropriate management of toxic and hazardous wastes are as yet in formative stages. These nations are being offered multi-million dollar contracts for accepting wastes from countries where regulations are more stringent and where, consequently, disposal costs are even higher.

Waste merchants, waste generators and even regulatory agencies of the exporting countries are giving assurances to recipient countries to the harmlessness of wastes from which no safe means of disposal exist. This situation sets the stage for environmental and public health catastrophes of unprecedented magnitude and duration.

On May 25, 1988, African foreign ministers pledged to stop the dumping of foreign wastes in Africa. In a declaration drafted to mark the 25th anniversary of the founding of the Organization of African Unity, African states pledged 'to refrain from entering into agreements or arrangements with any industrialized countries, transnational corporations, private companies or interest groups on the dumping of nuclear and hazardous industrial waste on African territories.'

In late May, the European Parliament in Brussels unanimously passed a similar resolution calling for a ban on the large scale export of toxic waste from Europe to developing countries.

Opposition to the international trade of toxic wastes is growing as rapidly

as the actual flow of wastes from industrialized countries to less-developed countries. It is Greenpeace's hope that this working group will seize the initiative to prohibit the international flow of toxic wastes.

## RECOMMENDATIONS

Greenpeace will cooperate with UNEP and interested governments and organizations in the adoption of a Convention which would prevent, rather than facilitate, the international trade in wastes. We require a strong Convention rather than a simple mechanism for approval of exports. Therefore, Greenpeace International recommends that the *Ad Hoc* working group:

1. Act in accordance with Principle 21 of the 1972 Declaration of the United Nations Conference on the Human Environment. This principle states that it is the responsibility of each state to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.
2. Act in accordance with the Cairo Guidelines of 1987, which state, in part, 'States should take such steps as are necessary to promote the development and employment of low-waste technologies applicable to activities generating hazardous wastes and the recycling and reuse of hazardous wastes unavoidably produced by such activities.'
3. Recognize that the international commerce in wastes inevitably releases contaminants into countries of import, and that this trade discourages the prevention of wastes at their point of origin.
4. Draft, in accordance with the above principles, a Convention which severe-

ly restricts or bans the international commerce in wastes, including the transboundary movement of treatment/disposal technologies which lead to international waste trade.

5. Include, within such a convention, all wastes, excluding only those raw materials for use exclusively in production processes which are scientifically demonstrated not to release toxics to the environment. This ban would include all wastes that, during their treatment, storage, transportation and/or disposal, form or release toxic or hazardous substances.

## TRENDS IN INTERNATIONAL WASTE TRADE SHIPMENTS

Over the past several months, Greenpeace has compiled an inventory of recently proposed or actual shipments of wastes from one country to another. This inventory is growing at an alarming rate. More companies and countries now regard the export of wastes as a potential waste disposal option than ever before.

Historically, the primary trade in wastes has been conducted within industrialized Europe and North America. Today this trade has exploded into less-industrialized regions. In particular, Africa, the Caribbean, and Latin America have become the preferred dumping grounds by waste pedlars from industrialized countries.

Trends in the global waste trade can be segregated into certain major routes of transportation: from Europe and the United States to Africa; from industrialized countries to the United Kingdom; between the United States and Canada; from the United States to Mexico; and from the United States to Latin America and the South America.

A review of these trade routes follows.

### From Europe and the United States to Africa

The recent Organization of African Unity Foreign Ministers' declaration against the disposal of foreign wastes in Africa reflects the staggering increase in actual and proposed shipments of wastes to Africa. According to one EPA official, there have been more proposals to ship hazardous wastes from the US to Africa in the past few months than there have been in the previous four years.

A recent OECD background paper states that traffic of toxic wastes from Europe to developing states 'could be very profitable and may well increase in the future'. Most of the waste importation schemes proposed in Africa remain in the planning stages.

The only confirmed shipment of toxic wastes in 1988 from the United States is the shipment of 15,000 tons of toxic ash from Philadelphia on Kassa Island, Guinea (see case study). The government of Guinea is attempting to force the re-export of the wastes. The only confirmed shipments of toxic wastes from Europe to Africa in 1988 are two loads of nuclear wastes from France dumped in Benin. The government of Benin reportedly took the wastes in exchange for economic aid.

A summary of other schemes to ship wastes into Africa follows:

- One major exporter of wastes to Africa is Intercontrat S.A., of Fribourg, Switzerland. This firm, joined by waste exporters in the UK and US, may ship up to 3,500,000 metric tons of waste from North America and Europe to Guinea-Bissau for dis-

posal in a landfill near the Senegal border.

- Intercontrat S.A. is also reportedly negotiating a contract with Senegal to dump an undisclosed volume of wastes north of Dakar.
- Greenpeace's Italian office recently discovered that Intercontrat S.A. may have managed at least five shipments of toxic wastes from Italy to Koko, Nigeria, between March 1987 and March 1988. It is not known whether the government of Nigeria officially accepted these wastes. Nigeria has been an outspoken opponent of shipments of wastes to Africa.
- A joint venture between Bauwerk A.G. of Liechtenstein, Ven Santen B.V. of the Netherlands and Waste Export Management of the United States is threatening the shipment of one million tons of chemical wastes to the Congo from the United States, the Netherlands, Belgium, Luxembourg and West Germany.

The venture suffered a setback in May when the Congo revoked permission to Waste Export Management to ship US wastes to the Congo. The Congo government now claims that it would never import foreign wastes.

- Another major proposal may bring up to 5,000,000 tons of industrial waste a year to Benin. Under a contract dated January 12, 1988, Sesco Ltd., will deliver up to five million tons of toxic waste from Europe and North America to Benin each year, and will pay Benin \$2.50 per ton of waste delivered.
- According to *Africa Analysis* newsletter, Equatorial Guinea is also considering importing European wastes. An unspecified British firm apparently

has obtained a ten-year license to dispose two million drums of chemical wastes on Anubon Island in exchange for a payment of \$1.6 million.

- The president of Gabon reported met with the board of directors of Denison Mining of Colorado in 1987, and agreed to import uranium tailing wastes into Gabon.
- South Africa has imported mercury wastes from American Cyanimid of the United States. At least two shipments occurred in 1986. Other shipments may have occurred since 1986.

#### From Industrialized Countries to the United Kingdom

In the 1980s, the United Kingdom has become a major recipient of hazardous wastes from continental Europe, the United States and New Zealand. According to the United Kingdom Department of the Environment, the tonnage of wastes imported from continental Europe into the UK has increased from 5,000 tons in 1983 to 25,000 tons in 1985 to 250,000 tons in 1987, largely because British waste disposal fees are much lower than fees in continental Europe.

Waste imports from the United States have increased similarly. In 1981, only two US companies informed the US Environmental Protection Agency that they intended to ship wastes to England. This number quadrupled by 1987.

New Zealand recently joined the growing list of exporters of wastes to the UK. Earlier this year, the New Zealand government announced that it has shipped, and will continue to ship, PCB wastes to Wales for incineration.

## Between the United States and Canada

The US Environmental Protection Agency estimates that as much as 75% of the wastes exported from the US are disposed of in Canada. In 1987, over 400 companies, mainly in New England, New York and Michigan, shipped hazardous wastes to Canada. Most of these wastes are burned in incinerators in Ontario or are land-filled near Montreal, Quebec.

Approximately 400 Canada firms exported hazardous wastes to the United States in 1987. Canadian wastes accounted for virtually all of the waste shipments into the United States last year.

## From the United States to Mexico

Large volumes of hazardous wastes from the United States are dumped in Mexico each year, despite a Mexican Presidential Decree which prohibits the importation of hazardous wastes into Mexico for disposal.

A US — Mexican treaty, signed in 1986, regulates the shipments of hazardous wastes between the two nations. Although Mexico only accepts hazardous wastes destined for recycling, not disposal, according to the US EPA, 'There is a growing potential for abuse of the export process to dispose of worthless hazardous waste ... under the guise of recycling, a process commonly referred to as 'sham' recycling.'

The volume of wastes illegally dumped in Mexico from the US is difficult to quantify. Wastes may be entering Mexico hidden in railcars or trucks loaded with other goods. According to the Worldwatch Institute, 'There have been numerous reports of illegal shipments (to Mexico), and several indictments.

Dumping in the State of Tijuana is alleged to have caused problems.'

According to a 1987 *Houston Post* article, US officials are prosecuting US companies 'for dumping incidents in Tecate and Mexicali, Mexico.' An EPA official, who asked not to be named, said the agency must rely on manifests provided by shippers as the chief source of tracking hazardous wastes into Mexico. And even that was opposed by some EPA insiders during development of the agency's rules for enforcing the treaty change.

The *Houston Post* article continued, 'Officials of the US Customs Service, whose agents are supposed to verify hazardous waste shipments leaving or entering the country, were so concerned about safety at border crossings into Mexico that at one point, officers were told to not open the containers or otherwise try to check their potentially deadly contents against manifests presented to them by (truck) drivers.'

## From the United States to Latin America and the Caribbean.

The Caribbean and Latin America are facing a flood of schemes to import wastes from the United States. Latin American and Caribbean countries and territories that have rejected schemes to dump US or European wastes in the past three years include: The Bahamas, Belize, Bermuda, Costa Rica, Dominican Republic, Guatemala, Haiti, Honduras, Martinique, Mexico, the Netherlands Antilles, Panama and Venezuela.

Countries in the Americas that face active foreign waste disposal schemes include: Argentina, Brazil, the Dominican Republic, Guyana, Haiti, Mexico, the Netherlands Antilles, Paraguay, Peru, Surinam, and Uruguay.

## CASE STUDIES OF INTERNATIONAL WASTE TRADE

Ill-fated waste disposal schemes originating in Italy and Philadelphia, USA, have become symbols of the burgeoning, and often disastrous, international trade in hazardous wastes. These particular schemes, involving corroded barrels of toxic wastes from Europe, and piles of toxic ash from the United States, have brought world attention to the hazards of the international waste trade.

### Italy's Fleet of Toxic 'Ghost Ships'

Italy may hold the world's record for the most nautical mileage logged in search of a dumping ground for a single shipment of toxic waste. It has taken three separate vessels over 14 months to carry one shipload of 2,076 tons of toxic wastes to four continents.

The ships have traveled from Italy, to Djibouti, to Venezuela, back to Italy, to Syria, and back to Italy again. Greenpeace estimates that the three ships, the LYNX, the MAKIRI, and the ZANOOBIA, have logged a cumulative 17,400 nautical miles in this futile quest for a place to dump the leaking, corroded barrels of toxic wastes.

The quest has been as tragic as it has been futile. According to some sources, at least two people may have died from exposure to toxics leaking from the corroded barrels of waste. A boy in Venezuela and a crewperson of the ZANOOBIA have died, possibly due to exposure to the Italian wastes. Further, nine other crewpersons of the ZANOOBIA were hospitalized in May 1988 for health problems after suffering prolonged exposure to the wastes.

### The LYNX (Italy to Djibouti to Venezuela)

The Maltese-flag ship LYNX left the

port of Marina di Carrara, Italy, in February 1987 bound for the African nation of Djibouti. The LYNX carried 2,200 tons of undetermined toxic wastes delivered by a firm named Jelly Wax, which had collected the wastes from numerous Italian waste producers. The LYNX originally planned to carry 3,000 tons of wastes, but faced growing protests and left Italy quickly.

Another company, Ambrosini of Genova, loaded the wastes on the LYNX for Jelly Wax. Ambrosini declared all permits to dispose of the wastes at Djibouti were in hand. However, Ambrosini's documents failed to give any exact description of the source and composition of the wastes. There was no documentation of the identity of the waste producers, nor any detailed inventory of the wastes. Despite these deficiencies in documentation, Italian authorities gave Ambrosini permission to load the wastes and depart Italy.

When the LYNX arrived at Djibouti it was discovered that there was no contractual agreement with local authorities for disposal. The government of Djibouti prohibited the ship from unloading.

At this point, Jelly Wax brought legal action against Ambrosini in Italy and assumed responsibility to look for another destination for the wastes. Jelly Wax claimed they were taking responsibility for 'ethical' reasons.

Jelly Wax reached an agreement with the Panamanian firm, Mercantil Lempert S.A., which claimed to have a permit for the disposal of toxic wastes in Venezuela. The LYNX then sailed directly from Djibouti to Venezuela in March 1987.

The wastes were unloaded at Puerto

Cabello, Venezuela in April 1987. The barrels of wastes were abandoned above ground, in the open air, without protection, for six months.

In August 1987, the Venezuelan government ordered Jelly Wax to remove the wastes from the country after waste began to leak from the barrels. According to a Reuters article, toxic gases spewed from the barrels, causing sores on nearby residents. According to other reports, a boy in Puerto Cabello died after playing near the wastes.

#### **The MAKIRI (Venezuela to Italy to Syria)**

In October 1987, the Cypriot-flag cargo ship MAKIRI arrived in Puerto Cabello, Venezuela and retrieved the barrels of waste dumped by the LYNX. The MAKIRI, chartered by Jelly Wax, may have also picked up wastes dumped by French and German firms in Venezuela.

The MAKIRI sailed from Venezuela on November 17, 1987, and was scheduled to bring the wastes back to Italy, as requested by Venezuela. But the wastes did not return to Italy. After stopping at the port of Cagliari on the Italian island of Sardinia, the MAKIRI changed its destination from Marina di Carrara, Italy, to Tartous, Syria.

The MAKIRI arrived in Tartous sometime between December 10 and 23, 1987, unloaded its toxic cargo, and departed on December 27. Jelly Wax paid US\$200,000 to the Syrian company, Samin, and the US\$102,000 to the Greek shipping agency, Alsa Shipping after the wastes were unloaded in Syria.

#### **The ZANOOBIA (Syria to Greece to Italy)**

In February 1988, Jelly Wax's wastes

in Tartous, Syria were loaded on yet another vessel, the ZANOOBIA. According to Ahmed Tabalo, the captain of the ZANOOBIA, the Syrian government ordered the Syrian firm, Samin, to remove the wastes from Tartous.

The ZANOOBIA carries a Syrian flag and claims it is owned by Tabalo Shipping. The vessel's captain is named Ahmed Tabalo. However, this reported ownership is questionable. According to ship registries, the only vessel with the name ZANOOBIA is owned by the government of Iraq, and reportedly has been delayed in the war-torn Shatt-al-Arab area of Iraq since 1980. Further, the ship's captain, Ahmed Tabalo, according to a reliable Italian government source, may have been involved in the illegal export of weapons from Italy to the Middle East.

En route from Syria, the ZANOOBIA stopped in Greece, where it may have again been denied permission to unload its cargo.

The ZANOOBIA appeared off the port of Marina di Carrara, Italy, on April 26, 1988, and asked for permission to unload the wastes which left Marina di Carrara fourteen months earlier. Port authorities denied permission because the ship lacked any permit to dispose wastes in Italy. Captain Tabalo declared Jelly Wax as the owner of the wastes. Jelly Wax has refused responsibility for the wastes, claiming it is the property of Samin.

The ZANOOBIA remained anchored off Marina di Carrara through May 1988. According to eye-witness accounts, some barrels of waste are corroded and the crew of the ZANOOBIA are reported to be suffering health problems, including skin inflammation and shortness of breath. Several crew persons

were treated at a hospital during the month of May.

After the ship arrived at Marina di Carrara, Ahmed Tabalo said, 'the condition of my crew is very bad. For three months we have not entered a port. Now we are all nauseous and sick to the stomach.'

Further, according to lawyers for Tabalo Shipping, a ZANOOBIA crew-person died en route to Italy, possibly due to exposure to the ship's cargo.

In late May, the Italian government agreed to take the wastes, but the unloading of the cargo in Genoa was delayed when port workers declared a strike in protest of the fumes coming from the so-called 'ship of poison', the ZANOOBIA.

#### The United States' fleet of renegade ash ships

The city of Philadelphia, on the east coast of the United States, faced increasing difficulty through the 1980s in finding a place to dump toxic ash from its garbage incinerators.

In desperation, the city allowed two separate hauling firms to haul its ash out of the country. Both firms are still searching for a permanent home for their toxic cargo. An international search is on for Amalgamated Shipping's renegade ash vessel, *Khian Sea*, which illegally left anchorage in the United States in late May. The ship was last seen heading toward the open ocean and is believed to be headed toward the Caribbean. Bulkhandling Inc. already offloaded a cargo of ash in Guinea; however, Guinea is trying to force Bulkhandling to re-export the ash from that country.

#### The Tale of the KHIAN SEA

On August 31, 1986, the Liberian-

flagged vessel, *Khian Sea*, departed Philadelphia loaded with 13,476 tons of toxic municipal incinerator ash. The ship's charterers, Amalgamated Shipping of the Bahamas, received the ash from the Philadelphia waste hauling firm, Paolino and Sons.

Amalgamate Shipping appears to be an offshore branch of the actual owners of the vessel, Lily Navigation of Liberia. The *Khian Sea*'s US representatives are Coastal Carriers of Maryland.

The *Khian Sea* originally planned to offload its toxic cargo in the Bahamas, but was rejected by the Bahamian government. This rejection triggered a journey through the Western Hemisphere for a dumping ground. Between 1986 and 1988, the *Khian Sea* and its cargo were rejected by the Bahamas, Bermuda, Honduras, the Dominican Republic and Guinea-Bissau.

The ship also traveled through the Panama Canal to the Pacific Coast of Colombia in mid-1987. The nature of the ship's business in Colombia is unclear.

On October 26, 1987, the Haitian Department of Commerce issued a permit to import to the *Khian Sea*. The permit was issued for 'ingrais pour du sol' — that is, fertilizer. The ship's real cargo, however, was the toxic ash from Philadelphia.

The importation of the wastes was arranged by a group calling itself 'Cultivators of the West', which actually consisted of the two brothers of Haitian Colonel Jean-Claude Paul, who widely is rumored to control the right-wings segments of the Haitian military. In March 1988, Colonel Paul and one of his brothers involved in the ash deal were indicted in the United States for alleged ties to cocaine smuggling into the US.

On December 31, 1987, the *Khian Sea* sailed into Gonaives, Haiti. Three weeks later, on January 21, 1988, some 100 Haitian laborers began unloading ash from the ship.

On January 29, 1988, the Haitian government ordered the ash out of the country, citing a constitutional provision against the importation of foreign wastes. Haiti's minister of commerce, Mario Celestin, said, 'All means will be taken so that all quantities dumped will be reloaded and the boat will be dealt with according to the law.'

Six days later, the *Khian Sea* departed Gonaives in the middle of the night, leaving behind an estimated 3,000 tons of Philadelphia's incinerator ash.

On February 15, 1988, a Greenpeace investigative team documented the ash pile on a remote peninsula outside Gonaives, Haiti. A portion of the ash pile abuts the Bay of Gonaives, and some ash likely has entered the salt water bay. Investigators also viewed strong ocean breezes carrying the ash toward the city of Gonaives. The ecology of the immediate area is mixed beach/mangrove.

Greenpeace officials met with the Prime Minister of Haiti, Martial Celestin on February 19, 1988. Later that day, the Haitian government announced a decree banning any ships carrying wastes from other nations from entering the country's waters.

The *Khian Sea* returned near Philadelphia on March 1, 1988, anchoring in Delaware Bay, some 100 miles south of Philadelphia. Amalgamated Shipping intended to return the ash to Paolino & Sons' pier in Philadelphia; however, a devastating pier fire, and financial haggling between the two firms, delayed

the return of the ash to Philadelphia.

While the *Khian Sea* remained anchored in Delaware Bay, Haitian opposition to the ash pile in Gonaives mounted. On March 25, 1988, citizen leaders in Gonaives were warned by the military against a march scheduled to protest the ash pile. Later that month, the military explicitly forbade the march.

In April, several hundred Haitian refugees in Miami pledged to march every second Saturday until the ash is removed from the beach in Gonaives.

In the early morning of May 22, 1988, the *Khian Sea* disobeyed US Coast Guard orders to remain anchored in Delaware Bay, and headed toward the open ocean. The Coast Guard followed the renegade ash ship, but lost track of the *Khian Sea* 50 miles offshore.

Amalgamated Shipping has not disclosed the intended destination of the ash ship. According to Lloyds of London, however, the *Khian Sea* is going to an undisclosed location in the Caribbean. There is growing fear that the ship may dump its cargo in the open ocean, or on yet another developing country.

#### **The Saga of Bulkhandling Inc.'s Efforts to Dump Toxic Ash**

Last year, Bulkhandling Inc. made plans to ship 250,000 tons of Philadelphia ash a year in Panamanian wetlands as use as roadfill. Just before the first shipload of ash was scheduled to leave Philadelphia, Panama cancelled the contract, saying the ash is toxic and that 'the national defense forces would intercept the ship', if Bulkhandling brought the ash into Panamanian waters.

Bulkhandling then began searching

for another disposal site for the 30,000 tons of ash in their possession. Half of the ash was shipped to a landfill in Ohio; the other half was taken to the island of Kassa, Guinea, aboard the vessel *Bark*.

Bulkhandling is a consortium of Norwegian shipping firms based in Oslo and established in 1962. Klaveness Chartering holds a 48% share in Bulkhandling, and owns the vessel, *Bark*. Klaveness was established in 1957.

Klaveness has extensive contracts in developing countries, particularly Guinea, Guyana and China. According to Johan Werner of Klaveness, his company has been operating in Guinea since 1958. The firm's primary business in Guinea involves exports of bauxite to Europe.

The problems faced by the city of Philadelphia and Bulkhandling Inc. in disposing of this municipal incinerator ash are due to the toxic chemicals and heavy metals that are present in the ash.

Last October, the Inspector General of the US EPA wrote, 'the ash presents a significant potential danger to human health and the environment due to concentrations of dioxins higher than some of those identified at Times Beach, Missouri.' Times Beach was a small town that was evacuated and abandoned due to dioxin contamination. Dioxins are recognized as the most toxic organic chemicals ever produced.

The Inspector General continued, 'Samples of the ash have also been shown to contain levels of lead, cadmium and benzene which occasionally exceed hazardous waste thresholds, as well as a wide array of other heavy metals and toxic chemicals. Significant

amounts of these substances in the ash will very likely waste directly into the wetlands and aquatic environments (of Panama), possibly damaging or killing aquatic life and entering the human food chain.'

Numerous government agencies have tested Philadelphia's ash for toxic heavy metals and organic chemicals. List A gives the range of concentrations of toxics found in Philadelphia's mixed bottom/fly ash in tests run by the US Environmental Protection Agency, the Centers for Disease Control, the city of Philadelphia and Greenpeace USA. For comparison, note the European Economic Community's limit values for concentrations of heavy metals in soil.

According to a EPA scientific study of dioxin contamination in residential areas of Midland, Michigan, 'a prudent policy would be one eliminating exposure to contaminated soils which have 2,3,7,8-TCDD equivalent concentrations exceeding 75 parts per trillion'.

Bulkhandling's managers made arrangements with Panamanian entrepreneurs to build roads through fragile Panamanian wetlands using Philadelphia's ash. Unfortunately, Bulkhandling neglected to run toxicity tests on the ash. The Panamanian government rejected the plan after Greenpeace supplied the government with toxicity data taken from reports by the US Environmental Protection Agency and from analyses carried out under contract for Greenpeace.

In a meeting between Bulkhandling and Greenpeace officials on 29 April 1988, Johan Werner of Bulkhandling was asked if his firm ran any tests on Philadelphia's ash before they contracted to ship the ash to Panama. Werner replied, 'We didn't check on the mate-

rial's toxicity, we thought it was Panama's responsibility.'

When Bulkhandling's vessel, the *Bark*, left Philadelphia on 7 February 1988, Bulkhandling officials listed Haiti as the intended destination of the ship and its toxic cargo. When news of the *Bark's* departure reached the press, Bulkhandling refused to say where the ash ship was going. 'We are not at liberty to say. I just can't speak to that,' said Lewis Olshin, Bulkhandling's attorney on 12 February 1988.

But Bulkhandling now admits that when the *Bark* departed Philadelphia, they did not really know what was the ship's next port of call. As Johan Werner admits, Bulkhandling shipped its ash out of Philadelphia because it was facing non-compliance with a court order to remove the ash from its Philadelphia pier. If the ash was not cleared from the

pier, Bulkhandling would have had to pay \$10,000 a day — more than an average day's operating costs for a ship at sea.

The *Bark* arrived in Guinea as much by mistake as by design — and it arrived despite a two-year prohibition against foreign wastes from entering Guinea. Bulkhandling apparently assured the Guinean government that the ash is harmless. In an 15 April 1988 telex, Johan Werner wrote, 'Test (sic) performed by US Environmental Protection Agency approved laboratories of the ash . . . have not been able to detect any hazardous elements neither in the ash as presently stored.'

Bulkhandling intended to create a 'new product' with this ash in Guinea. Bulkhandling claims that this 'new product' is harmless, and hopes to market this concrete-like material thr-

#### List A

##### Range of concentrations of toxic heavy metals and dioxins in Philadelphia ash (mixed bottom/fly ash)\*

Toxic heavy metals (parts per million) Min — Max	EEC Limit Values for Concentrations of Heavy Metals in Soil (parts per million)
Aluminium 11,906 — 13,586	
Arsenic 4.1 — 65	
Barium 202 — 300	1 to 3
Cadmium 7.6 — 378	
Chromium 23 — 47	
Copper 459 — 1,275	50 to 140
Cyanide 0 — 2.6	
Lead 1,058 — 6,160	50 to 300
Mercury 0.23 — 11	
Nickel 29 — 61	30 to 75
Zinc 1,553 — 9,281	150 to 300
<b>Dioxins (parts per billion)</b>	
2,3,7,8-TCDD: 0.04 — 1.015	
Total dioxins : 0.184 — 4.7	

\* Samples taken from files in Haiti, on Khian Sea and on incinerator grounds.

## Ships shuttle from port to port in search of dumping ground for poison waste

# Third World awakes to toxic trade perils

From Roger Boyes in Rome and Sam Kiley in London

The poison ship *Zanoobia* bobbed uncomfortably yesterday in the muddy waters of Genoa harbour, its hold still fuming with 11,000 barrels of toxic waste shuttled round the world in search of a safe dumping ground.

This is the latest in a series of shipments of potent industrial poisons, sent to the Third World for a quiet burial, that have bounced back to embarrass West Europe and the US.

Some 20 million tons a year of chemical poison are shipped from Europe to the developing countries. The toxic cargoes are poorly monitored, the documents vague, destinations and ship names often switched — a traffic conducted with all the secrecy of international arms dealing.

Italy is catching most of the criticism at the moment but British, West German, Dutch and American companies are also deeply engaged in the waste-trafficking business. Greenpeace this week released a report detailing 62 "active" waste export deals, although 22 were to Britain from industrialized countries, the rest are bound for Latin America, the Caribbean and Africa.

Developing nations have moved to stop the use of their territory as a tip for their industrialized neighbours — last month the Organization of African Unity banned the importation of hazardous

nuclear and industrial waste to the continent, and the European Parliament resolved to call for a ban on waste exports from Europe, embarrassing industrialized nations into taking their rubbish back.

The *Zanoobia* shipment of 2,000 tons of resins, pesticides and polychloride biphenyl, was first loaded onto a Maltese vessel in Italy, but was turned away from Djibouti (because the authorities believed, wrongly, that it was radioactive).

It sailed for Venezuela, where a child is reported to have died after contact with the chemical containers, and the load was transferred to the Syrian-registered *Zanoobia* and sent out to sea.

It returned to Syria, where it again was denied a berth. The tanks now brew beneath the Mediterranean sun in the country that produced the waste, while Italian officials, and Syrian sailors suffering from skin diseases and breathing problems, work out how to dump the undumpable.

Likewise, the Liberian-flagged ship *Khian Sea*, loaded with more than 13,000 tons of toxic incinerator ash from Philadelphia (including dioxins, the most deadly organic material known) was refused entry to the Bahamas late in 1986, then Bermuda, Honduras, the Dominican Republic and Guinea-Bissau rejected

her before she dumped the cargo in Haiti last January.

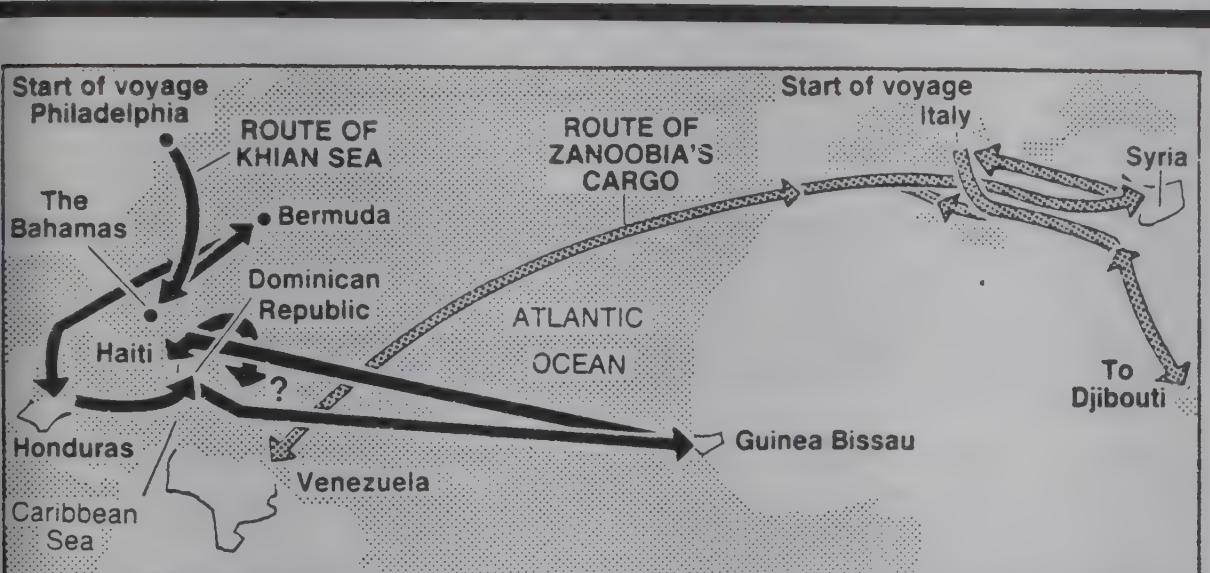
There, Greenpeace claims, the ash was described as "fertilizer". It also claims that days later the ship was ordered to reload the cargo, which it did, but left 3,000 tons behind. The *Khian Sea* is now believed to be heading for the Caribbean with the remains of the poisonous ash on board.

This week the Norwegian Government announced that it was sending a vessel to pick up another load of Philadelphia's toxic ash which had been illegally dumped on an island off the coast of Guinea.

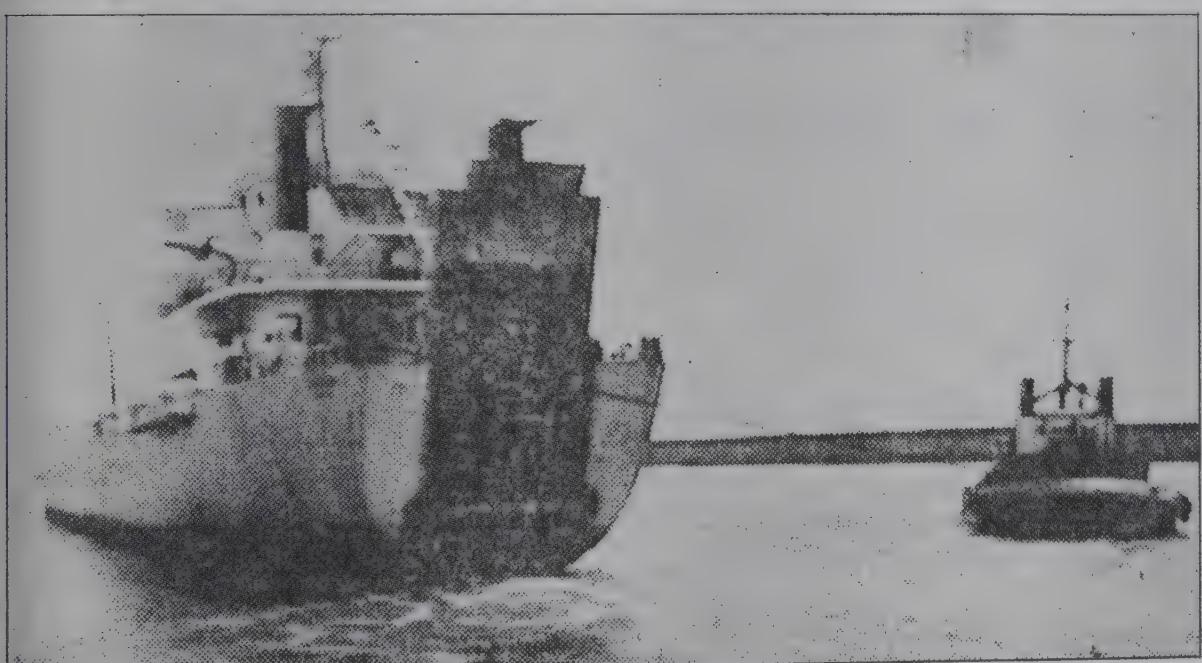
"We are worried that if they continue to shuttle back and forth the owners might be tempted to dump the load at sea or scupper the ships altogether," said a Greenpeace spokesman in Washington, Mr Jim Vallette.

Though Third World governments are beginning to grasp the dangers, they are reluctant to lose a useful source of hard currency.

Greenpeace says that Guinea-Bissau, Benin and Gabon are involved in waste export deals of toxic and nuclear materials, while Argentina, Brazil, the Dominican Republic, Guyana, the Dutch Antilles, Paraguay, Peru, Surinam and Uruguay plan to sell dumping-land to the industrialized North.



A map showing the travels of two loads of toxic waste. Zanoobia is Syrian-registered and carrying Italian waste, and Khian Sea is Liberian-flagged and loaded with American ash.



A tug moving the Zanoobia and its cargo of toxic wastes to an isolated Genoa berth after port workers walked off the job in protest at the smell and fumes spreading from the vessel.

oughout West Africa. But in their 29 April 1988 meeting with Greenpeace, Bulkhandling officials admitted that they have not made any attempts to determine whether or not the toxic substances in the ash will migrate during the manufacture or use of the 'new product'.

Of most immediate concern is the health and welfare of any workers involved in the manufacture of products from the incinerator ash. On 7 March 1988, the Agency for Toxic Substances and Disease Registry (ATSDR), an arm of the US Centers for Disease Control, released a 'health consultation' regarding Philadelphia's ash.

The agency noted that the ash poses a health risk to anyone who comes into

contact with it. The agency recommended that the city of Philadelphia 'restrict all public and unprotected worker access to the ash pile'. The agency also recommended that 'on-site workers ... wear proper personal protective equipment and exercise proper personal hygiene'.

Both human health and the environment are also at risk from potential migration of toxics into the air and water during any processing and use of the ash or ash-derived products.

The government of Guinea has ordered Bulkhandling to remove the ash from the country. The Norwegian firm now is considering bringing the ash to a landfill in Ohio in the United States, after hauling it by barge up the Mississippi and Ohio rivers.

# Impact of toxic wastes in Asia

## MALAYSIA

People near nuclear waste plant suffer miscarriages & ill health

By Halinah Todd

IN THE small Chinese village of Bukit Merah, in the state of Perak, Malaysia, 15 young and healthy women have either miscarried in their last five months of pregnancy or delivered still-born babies over the last four years.

Children of the village are often sick, with skin and respiratory problems, their parents say.

The residents of Bukit Merah point the finger at a factory one kilometre from the village. Asian Rare Earth (ARE), which has been operating since 1982, processes monazite from tin tailings. The process produces a radioactive waste, thorium hydroxide.

This factory has been the focus of a citizen's protest movement unique in Malaysia and rare in the Third World. Residents in the area, mainly farmers, shopkeepers and workers in backyard industries, supported by a range of environmentalist and human rights groups, have waged a six-year battle against the factory's right to dump its waste in their environment.

The drama has moved into the courts, where residents are trying to close the factory altogether. In January 1988,

the court heard damning evidence about the ill-health of residents living close to the factory.

In their efforts to get the factory closed, local residents face some heavy opponents. ARE is jointly owned by Mitsubishi Chemical Industries of Japan, and a local company.

Japan is Malaysia's major trading and investment partner. All the products of the factory are exported (to Japan), which is in line with Malaysia's development strategy.

The first encounter between local residents and ARE, which began in 1982, was to reverse a government decision to store radioactive waste from the factory in a permanent dump site near the farming town of Papan.

In 1984, after two years of protest and demonstration had brought the whole issue of radioactivity and atomic energy into Malaysian consciousness, the government resited the dump to a less populated area.

Then the focus shifted to Bukit Merah, a community of 10,000 people, next door to the factory itself. Residents formed the Perak Anti-Radioactive Com-



*The ARE factory – the Bukit Merah residents want it closed down because the radioactive waste it produces is seriously affecting their health. (Photo: SAM)*



*Radioactive waste exposed in rusting and leaking petrol drums, within the ARE factory compound. (Photo: SAM)*

mittee and eight residents (one has since died of cancer) filed a claim in court to force the permanent closure of ARE and payment of compensation.

In January 1988, a Malaysian general practitioner (GP) and a Canadian public health expert presented evidence to a stunned courtroom that supported the gut-feeling of the villagers that the factory threatened their health.

Of 108 childbearing women under 30 in the village of Bukit Merah, no less than 15 suffered unexplained foetal deaths in the four-year period between 1982 and 1986, Dr T Jeyabalan, a Malaysian GP who has made a study in the area, told the court.

This works out to a perinatal death rate of 7% amongst the age group least likely to experience any problems bearing children. The average rate for Malaysian Chinese women of all ages and from all causes, including falls and accidents, is only 1.8%.

Dr Rosalie Bertell, a Canadian expert on low-level radiation, surveyed the children of Bukit Merah, with equally alarming results. She found that all the children studied had more than normal levels of lead in their blood. Five per cent had levels toxic enough to cause brain damage.

Dr Bertell, who is President of the International Institute of Concern for Public Health, told the court that the presence of lead was used as a marker for the entry of thorium. 'If lead is found then children are also taking in thorium,' she explained.

Most of the children also had lower than normal white-blood counts, particularly monocytes, the bone marrow cells which help the body fight infection.

'As the plant has only been in operation six years it is too early to say about cancers, which take time to develop. The blood lead level in these children is alarming enough,' Dr Bertell said.

'The problem I would be most concerned about is that of miscarriages. If there is a factor that causes death to a foetus, there will be other children born with defects. These children are going to have more difficulties than their parents,' she told the court.

Dr Jeyabalan tested 260 children in Bukit Merah and compared the results with a similar group of poor estate children in Selangor, another state.

'I found that the children in Bukit Merah, with better nutrition, had more illnesses than the Selangor children. My findings are consistent with Dr Bertell's observation that radiation breaks down the immune and reproductive systems in human beings,' he concluded.

This evidence was presented in the second hearing of the claim against ARE, part of a long legal saga involving the factory.

In October 1985, the residents succeeded in getting a temporary injunction to close ARE, after High Court Judge Datuk Anuar Zainal Abidin heard testimony that the thorium waste was being stored in plastic bags and leaking drums, exposed to the rain, in a yard next to the factory. A contractor testified that he had been hired to dump some of it into a pond.

'Money lost (by the company) can be recovered but not the lives of human beings. There is no cure for the effects of radiation,' Mr Justice Anuar remarked after granting the injunction.

However, in February 1987, ARE resumed operations armed with a licence

issued by the government Atomic Energy Licensing Board, which said the factory now complied with the standards imposed by the International Atomic Energy Agency.

Residents filed a contempt of court action against ARE for reopening, but this has not yet been heard. Meanwhile, in September 1987, a hearing of the claim for permanent closure began in front of Justice Peh Swee Chin. Lawyers expect these hearings to last for several months before the court gives its final judgement.

What surprised observers in January 1988 was the crowd outside the court-room. Not that large crowds are anything new in the anti-ARE struggle. When the protest against the Papan dump was mounted, thousands of residents blocked roads, waved banners and collected signatures.

At the first hearing in September 1987, the Perak Anti-Radioactive Committee mobilised more than two thousand Bukit Merah residents to attend court in support of the claim.

But in October 1987, five members of this committee were arrested under Malaysia's Internal Security Act (ISA),

as part of a wave of arrests of politicians and members of public pressure groups. In addition, a physicist from the National University, who had helped the Committee test radiation levels in the area, and a woman lawyer representing the residents, were also arrested.

Although all (except the university lecturer) had been released by January, the release of the committee members was conditional on their withdrawal from any leadership role.

In spite of these arrests, and the intimidating presence of more than 100 members of Malaysia's special riot squad and police around the court, hundreds of Bukit Merah's residents bussed into the town of Ipoh. Although they were barred by police from entering the court, they sat in silent vigil on the pavement throughout the five-day hearing.

In the absence of the usual leadership, it seemed to be the women who had taken over the struggle.

'We will fight on to protect our children and grandchildren. We are not afraid for ourselves,' said a mother sitting quietly on the pavement with her two children.



*Tests on Bukit Merah children showed high lead levels in blood. (Photo: CAP)*



*Left: Bukit Merah children outside the Ipoh High Court where the ARE trial was taking place. (Photo: CAP)*

*Bottom: Bukit Merah residents keeping vigil on the grounds of the Ipoh High Court during the hearing against ARE. (Photo: CAP)*



## LEAD POLLUTION IN BUKIT MERAH

### All children tested have toxic lead levels in blood

LATEST MEDICAL tests conducted in March – June 1988 at Bukit Merah show that every one of the 44 children tested had toxic levels of lead in their blood. The situation has worsened terribly compared to June 1987 when 4 of 60 children tested had toxic lead levels.

Dr T Jeyabalan who conducted the tests, said some of the children were already showing signs of lead toxicity. He found plumbline between the gums and teeth in 90% of the children. (Plumbline is a bluish colouration which indicates deposition of lead between the gums and the teeth.)

Lead is the most serious toxicological danger to children according to the American Academy of Paediatrics. It is associated with damage to the central nervous system, mental retardation, anaemia and other blood disorders, birth defects and miscarriages.

In the worst affected cases, three children had lead levels of 36, 38 and 39 ug/dlitre, which are alarmingly high toxic levels especially for children. 11-year-old Yeong Siew Ken who had the highest lead level in her blood of all the 44 children tested, fainted outside the court at the last morning of the court hearing against ARE on 21 July, 1988.

Dr Rosalie Bertell, who accompanied her to the General Hospital where she was warded said, "She had a monocyte count that was half the normal limit, which indicates either damage to the bone marrow or a reaction to a foreign body like lead."

The average lead level in the Bukit Merah children tested in 1988 was 27.5 ug/dl or 126% above the average of 12.18 ug/dl in the children tested in 1987.

"This indicates a very high increase in lead levels. The situation is now very serious for these children," said Dr Jeyabalan, who presented his findings at a court case brought by the residents to close down the ARE plant.

The residents claim that ARE is hazardous to their health because of its toxic wastes, which include radioactive thorium and lead. On 13 July 1988 Mr Chin Yiew Peng died of bone cancer, after fighting it for 8 months. Mr Chin, 48, was the Perak Anti-Radioactive Committee vice-chairman.

### LEAD IN WATER

Dr Jeyabalan also testified that he found high readings of lead in a river just outside the ARE temporary waste storage site. A water sample



*Yeong Siew Ken had the highest lead level in her blood of all the children tested.*  
(Photo: CAP)

from Sungai Serokai had 0.56 ppm of lead — about 11 times the samples in water level taken 1 km downstream. (0.05 ppm is the Malaysian safety limit for lead in water.) This strongly indicates that water flowing from the pipeline leading from the ARE temporary storage site contributes to the lead level in Sungai Serokai.

#### LEAD IN SOIL

There was a significant presence of lead in the soil samples tested by Dr Jeyabalan. He collected 3 soil samples in mid-July 1988, from the Sungai Serokai riverbed near the temporary dumpsite of ARE, from the same riverbed 100 meters from the factory, and from a vegetable

farm about 1 km from the ARE plant.

The results are as follows:

- Soil from Sungai Serokai near dumpsite — 36.2 ppm of lead.
- Soil from riverbed point 100 metres from factory — 2.74 ppm of lead.
- Soil from vegetable farm 1 km away — 22.5 ppm of lead.

#### LEAD IN PLANTS AND VEGETABLES

Dr Jeyabalan also found lead present in the vegetables and plants taken from 1 km and 100 metres from the ARE factory respectively. Tests for lead content found:

Corn — 0.32 ppm of lead  
Jambu batu — 0.26 ppm of lead  
Angle gourd — 0.25 ppm of lead  
Plant with seed pods — 2.89 ppm of lead  
Plant with flowers — 1.18 ppm of lead

There was significantly more lead in the plants collected 100 metres away from the ARE factory compared to lead in vegetables about 1 km from the factory. Dr Jeyabalan's investigations also showed that vegetables from the farm are supplied to the Bukit Merah market.

Says Dr Jeyabalan, "Analysing the various sources of lead toxicity in the children, I cannot rule out ARE as a source of the lead. In my opinion, the increased lead must have come from ARE's operations."

# PHILIPPINES

## Canadian joint venture dumps copper tailing into Calancan Bay

By George Martin Manz

CALANCAN BAY once teamed with fish. Local fishermen used a variety of fishing methods to catch the rich supply of tuna, mackerel and other fish which abounded in the warm tropical waters surrounding the Philippines.

Then Marcopper Mining Corporation arrived. They built an open pit copper mine on a small Philippine island in the 1960s. The company didn't bother to ask local fishermen if it could dump toxic copper tailings into Calancan Bay.

When copper production began in 1969, the copper tailings were dumped into a tailings pond. Then high grade copper was discovered under the pond and Marcopper decided to mine the pond area. So in 1975 the company began discharging its toxic wastes directly into Calancan Bay. The tailings are quickly spreading over the sea bed and now cover an area 5 km long and  $\frac{1}{2}$  km wide. This resulted in coral reefs being buried, the seawater poisoned and the fish either killed or driven away. The catch has been reduced by 90 percent.

Residents from nearby towns have not been spared the ill-effects caused by the tailings which have formed a desert in the bay. During the dry season, strong winds carry fine tailings particles inland which destroy agricultural land, plant life and contaminate water supplies.

Medical records show high incidences of respiratory, stomach and skin disorders among coastal residents compared to those in towns further inland. The Asia-Pacific People's Environment Network, a coalition of over 300 groups in the bay Pacific region, interviewed local residents. Those interviewed suffered abdominal pains and diarrhoea after eating shellfish and fish caught in the bay. Cases of food poisoning after eating fish were also reported. Respiratory illnesses are exceptionally high during the summer when sand-storms carry the dust particles from the dumping site. Children develop large sores, and rashes are common.

Marcopper Mining Corporation is a joint venture of two major corporations. Performance Investment Corporation, with 48 percent of Marcopper's stock is a company once owned by former Philippine president Ferdinand Marcos. Marcos personally owned 28.2 million shares. The other joint venture partner is Placer Development Ltd., of Vancouver with 40 percent of the stock. The remaining stock is spread out among other smaller shareholders.

When Marcos fled the Philippines in February 1986, hopes soared that Corazon Aquino's new government would come to the aid of the local fishermen and peasants. Telegrams were sent to the government opposing Marcopper polluting the bay.

The fishermen have launched a law suit against Marcopper. But the law suit might not be successful for an odd reason. Marcopper has fallen under government control because of Marcos' 28.2 million shares of stock in the company. Former newsperson-turned-

environmentalist Domingo Abadilla commented that under the new Philippine constitution, no one can sue the government without its consent. This consent is unlikely from a government plagued by increasing political and economic instability.

## JAPAN

### Mercury poisons people of Minamata Bay

MINAMATA DISEASE is the first occurrence of widespread methyl-mercury poisoning caused by man-made environmental pollution that the world has experienced. This disease, which has taken many lives, was discovered in 1956 and its cause proven by 1959. It received widespread publicity in the 1960s when it caused numerous deaths among Japanese fishermen and their families who lived in West Kyushu along the Minamata River.

Since the 1930's, Chisso Corporation, a chemical company, had been discharging industrial wastes containing poisonous mercury into the Minamata River. Since 1950, unusual changes were detected in these waters — fish floated on the surface of the sea and shellfish and seaweed died. Birds began to drop into the sea while flying. By 1953, cats, dogs and pigs went mad and died.

Nevertheless, fish continued to live in Minamata Bay, and fishermen continued to catch them for human consumption. In 1956, a five-year-old girl was sent to hospital with brain-damage symptoms. Five weeks later, five other villagers were found to be suffering from the same symptoms. The "Minamata Disease" had struck, and

would take on the proportions of an epidemic. The Minamata victims first complained of fatigue, loosening of teeth, and excessive salivation. Severe trembling, mental confusion, numbness, disturbed vision and speech, paralysis, general loss of bodily functions and convulsions followed. By late 1956 there were 52 known victims.

At that time, the Chisso waste water included poisons such as manganese, thalium, arsenic, mercury, selenium, copper and lead. Findings in 1959 showed an extraordinarily high level of mercury contamination in Minamata Bay. A high concentration of mercury was found in the internal organs of 23 people who died of Minamata Disease. A 1960 survey found a high mercury content in patients' hair, especially within one year after the onset of the disease. When fish was no longer consumed, levels gradually decreased with time. In late 1960, methyl mercury was found to be the cause of Minamata Disease.

Chisso at that time was using a large amount of inorganic mercury in their acetaldehyde and vinyl chloride manufacturing process. According to an estimate made later, the total mercury dumped by Chisso could be 200 to

600 tons. It was later found that the inorganic mercury used in the production processes had changed into organic mercury, followed the food chain to enter the fish, and then entered the human being. The waste of the acetaldehyde process continued to pour into the bay until 1968.

Congenital defects arose in children whose mothers had eaten a great deal of the fish and shellfish of Minamata Bay during their pregnancy. Characteristics of these children included serious mental retardation, disturbance of growth, character disorders, loss of consciousness and deformity of limbs.

Findings indicated that methyl mercury had passed through the placenta from the mother to the fetus, causing methyl-mercury poisoning. Congenital cases could also have been affected by the high levels of methyl-mercury in the mothers' milk.

The Minamata Disease is an example of the possible horrifying results of toxic waste dumping. We must put to use the lesson of Minamata for the rest of humankind. That is the only way to compensate those already victimized and to protect future generations from the same fate.



*Tomoko Uemura born in 1956, was poisoned by mercury in her mother's womb. (Photo: Eugene and Aileen Smith)*



*Chisso-Minamata disease attacks the nervous system — limbs degenerate and victims waste away.*  
(Photo: Eugene and Aileen Smith)

## Pollution as a result of toxic waste dumping in Jakarta Bay

PEOPLE living in the area around Jakarta Bay, Indonesia, have displayed symptoms similar to those of Minamata disease. The Jakarta Bay is polluted by industrial waste containing heavy metals and agricultural waste in the form of fungicides and herbicides which contain mercury. Some 30,000 small businesses dump contaminated wastes into the streams and rivers that flow into Jakarta Bay.

An examination of samples of fish, clams and shrimps revealed high levels of mercury content. Other heavy metals like lead and cadmium were also found.

Child and infant deaths from

convulsions were fairly common in villages in the bay area. Several miscarriages were reported, and several victims displaying mercury poisoning symptoms developed cancer. Physical and mental retardation, cleft palates, congenital birth defects, paralysis, respiratory problems, brittle bones and physical deformities were also reported.

The symptoms of mercury poisoning might well be aggravated with the presence of diverse amounts of heavy metals. The heavy metals and other pollutants that are found in the Jakarta Bay have been found to be carcinogenic, mutagenic and/or teratogenic.

# Thailand becomes a waste dump

**A**fter a year on the high seas, the vessel *Zanoobia* arrived back in Italy earlier this month — mission unaccomplished.

Unable to find a beach to deposit its noxious cargo of industrial waste, the ship's return sparked off widespread protests against the growing practice of hazardous waste-dumping.

Poisonous chemicals, industrial waste, even radioactive substances have become the target of a lucrative new trade of carrying waste from Western factories to the often unsuspecting docks of the Third World.

The practice that African consumer groups have come to call "toxic terrorism" is not so far from home.

This week Thailand officially joined the league of the international "waste dumpees", with the discovery that tonnes of toxic substances have been piling up at Klong Toey port over the past decade.

Though most of the barrels came from unknown shippers in Singapore, the National Environment Board (NEB) announced on Friday that some of the containers arrived from the US, Japan, Germany and Taiwan as well.

The Board has urged the Foreign Ministry to "take serious action" to return the rotting barrels to their countries of origin.

A team of NEB waste disposal experts paid a visit to the dock on Friday morning to collect samples from the various piles of drums. These will be rushed off to laboratories for analysis, to determine the nature of the substances, and the extent of the risks involved.

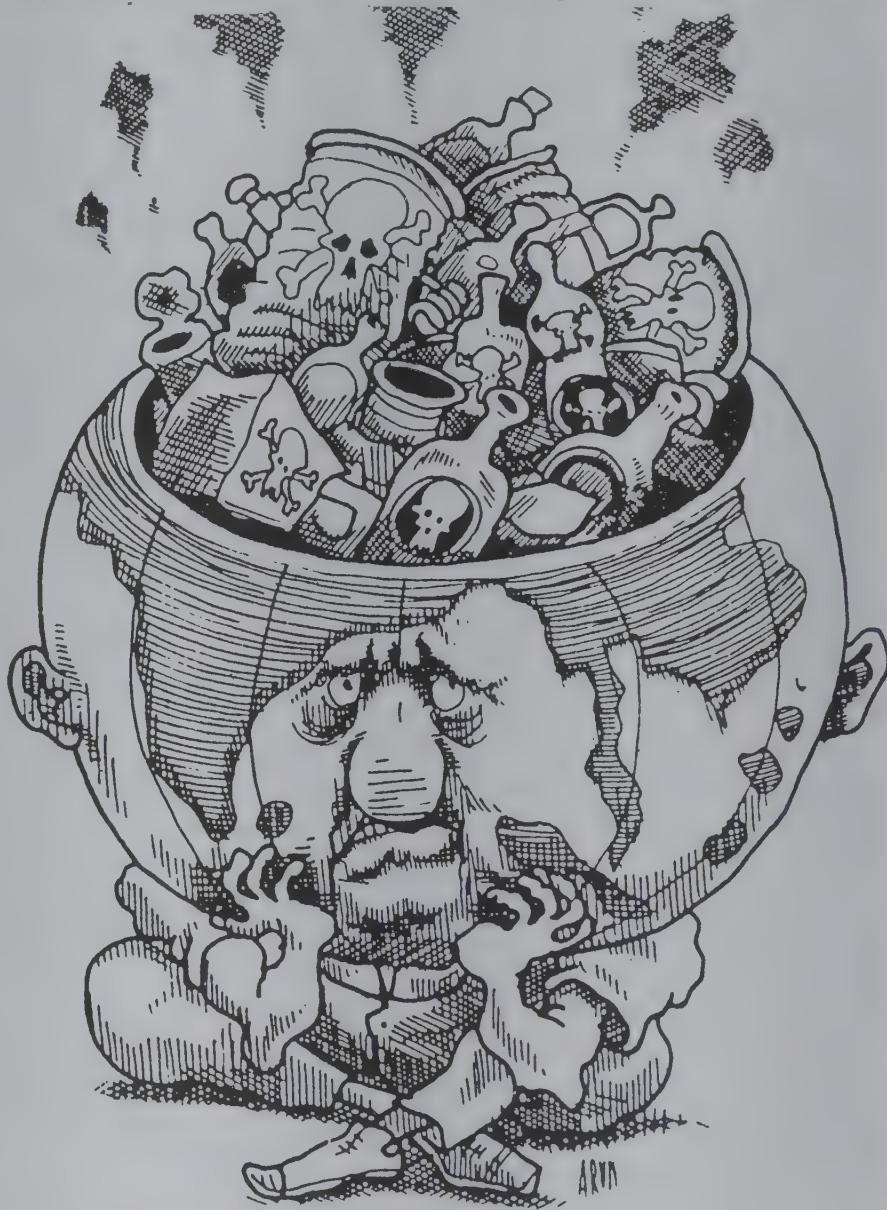
NEB officials have expressed the fear that the barrels may contain chemicals, such as deadly PCB's or dioxins, which can only be destroyed in high-temperature incinerators that Thailand does not possess.

But even when we find out what is in the barrels, we will be no closer to knowing who is responsible for delivering the poison, much less how to stem the tide of arrivals.

Thailand's predicament appears to differ from that of some African countries that become caught in the middle of big-money dumping deals.

From what we have learned so far about the drums at Klong Toey, these dumpers may be using a different system. Barrels are falsely

**Ann Danalya Usher** sorts through the issue of toxic waste from other countries being dumped in Thailand.



labelled, and then registered with fake shippers' and receivers' names. Ultimately, they are simply abandoned until someone stumbles upon them.

It is inefficiency, gross negligence and an outdated system that almost demands to be exploited, which explain how the situation has continued unnoticed for so long.

The shipping companies maintain they are not the owners, but only deliver the merchandise and are not responsible once it reaches the docks.

Cargo-handling laws are outdated, forbidding port officials to check incoming goods. Over the past decade, several shipments of abandoned containers were buried near the port, a practice that only stopped after an NEB warning in

1986 that it would contaminate groundwater.

Even NEB's response, though speedy over the past week, provokes questions. Board officials said at the beginning of the week that they had conducted tests in 1986 on the same barrels that remain sitting outside of Warehouse Five at Klong Toey port. What became of their warnings that the materials were toxic?

Compounding the problem is the lack of any binding international law on the transportation of hazardous substances.

A high level source who asked to remain unidentified declared on Friday that "this has become an international issue that cannot be allowed to drag on any longer".

# EEC hails African about-turn on toxic waste

By Special United Nations Service

EUROPEAN Economic Community environment commissioner Stanley Clinton-Davis welcomed this by the Guinea Bissau government's decision on June 1988 not to import toxic wastes from industrialised countries.

Guinea Bissau's minister for natural resources Filinto Barros announced that his country would not import toxic wastes from the West in accordance with the resolution by the organisation of African Unity (OAU) summit in Addis Ababa. The OAN condemned the use of African territory as a dumping ground for waste as a 'crime against Africa and the African people.'

African governments which have already concluded agreements for dumping waste on their territory were urged to end the agreements. Clinton Davis said, 'This is encouraging news, we are also glad to hear that the OAU has examined this difficult question.'

The commissioner had been concerned that EEC development projects in Guinea Bissau could be jeopardised by the risk of buried waste seeping into the ground water. He had also expressed his dissatisfaction that most EEC countries had not yet brought the 1986 EEC directive on the export

of toxic waste into their national legislation.

The directive stipulates that the importing country must first consent to the import of waste and must have the capacity to treat and render the waste harmless. 'The immediate priority now is to ensure that community member states apply the directive on the export of dangerous wastes,' Clinton Davis said.

'In the coming months we must also work toward a strict international agreement,' he added.

EEC countries will participate in negotiating an international convention on the transport of toxic wastes at a UN Environment Programme (UNEP) meeting in Caracas, Venezuela, beginning 6 June 1988. And EEC Environment Ministers meeting in Luxembourg on 16 June 1988 will be tackling the issue of non-implementation of the EEC directive.

The reversal of the Guinea Bissau government is considered here to be significant and a major victory for the OAU. The small west African nation was offered some 120 million dollars a year — a sum equivalent to its gross

national product — to bury industrial waste. Two British and one Swiss firm were involved.

Meanwhile, the Central African State of the Congo denied reports that it had signed an agreement to stock European waste on its territory. The Dutch transport company 'Van Santen' had announced that it had received a Congo government licence authorising shipment of the waste. Government officials insisted however that the country was sticking to the OAU resolution.

The European Environment Association (EEE), which exposed the contract with Guinea Bissau also claims the West African country of Benin was offered a contract by the British 'Sesco' company with a Gibraltar postal address. 'Sesco' allegedly offered Benin 2.50 dollars a ton to store some five million tons of waste, compared to 40 dollars a ton offered by other companies to Guinea Bissau and the normal cost of disposing waste in Europe estimated by EEE at 140-160 dollars a ton.

However, EEE also reports considerable concern expressed by the country's Health Ministry of the possible risks to the population. According to EEE, a wave of contracts exporting waste to Third World countries was

signed around 1980, coinciding with the tightening up of US legislation on toxic wastes. EEE has exposed the Detroit-based US 'Lindco' company as being involved in sending waste to Guinea Bissau, possibly through its European intermediaries.

The present wave of contracts which began last year could be linked to the 1986 EEC directive and recent decisions at the Paris-based organisation of European Cooperation and Development (OECD) on transport of toxic waste, according to an EEE spokesperson. He said the OAU resolution was 'important and timely' in this context. 'African countries have shown they are not willing to turn a blind eye to the dangers to their population for the sake of huge bribes from these Western companies.'

Belgian member of the European Parliament Francois Roelants de Vivier of the Ecology Party who chairs the EEE, noted that the option of getting rid of wastes cheaply by exporting them to the Third World for a fraction of the amount it would cost to treat them in Europe was at the root of the problem. 'The day when it will cost as much to treat the waste in the south as in the industrialised countries, they will be obliged to look into adequate treatment facilities in Europe,' he said.



# Turning Africa into a dump for rich nations

By NICHOLAS KOTCH,  
LAGOS, Thursday

Poisonous chemicals from Italy ooze out of leaky drums in an idyllic delta village. Philadelphia's municipal ash kills trees on a lush tropical island.

Many Africans equate what regional consumer groups describe as "toxic terrorism" to the slave trade. The modern version is just as nasty but the cargo is industrial waste, not human beings, and although the traffic is still one-way the direction has changed.

Helped by the absence of international laws and spurred by the profits to be made, specialist companies in the developed world are exploiting Africa's weakness to dump radioactive and toxic waste on the world's poorest continent.

African consumer organisations from 18 countries at a meeting in Nairobi on Tuesday deplored the dumping of industrial waste on the continent and demanded "an immediate stop to such shameful acts and call on all African governments and international agencies so act decisively on these acts of toxic terrorism".

Paradoxically, the well-meaning campaigns by the environmentalist Greens in Europe and North America have compounded the problem.

At least five African countries are linked to the trade, which first came to light last month, but only Nigeria and Guinea have admitted receiving waste.

Guinea has alleged that trees are being killed by waste from the United States on the island of Kassa, facing the Guinean capital of Conakry.

Nigerian's military government of President Ibrahim Babangida announced on Monday that some of the 3,800 tonnes of rubbish from Italy discovered at the tiny delta port of Koko was radioactive.

The local people are being evacuated and Italy has been ordered to remove the waste, including the deadly chemical PCB.

"This act of dumping of toxic and radioactive wastes on our shores clearly violates international laws and conventions" Nigerian Information Minister

Tony Momoh said.

But he may be wrong. United Nations expert Jan Huismans said: "As of now, nothing exists in the way of binding international law."

The developed countries disagree about which waste is hazardous, how to dispose of it, and how far governments are responsible for controlling private exporters.

Mr Huismans monitors the trade from Geneva where he is director of the International Register of Potentially Toxic Chemicals.

In a telephone interview from Lagos, I read him the list of 20 items totalling nearly 100,000 tonnes which an Italian businessman proposed to import into Nigeria.

They included 2,500 tonnes of PCB, 20,000 tonnes of exhausted earths, 5,000 tonnes of asbestos fibre and 12,000 tonnes of assorted pharmaceutical and industrial residues.

All of them, without any exception,



President Babangida: Victim.

tion, are toxic wastes. But PCB is the really nasty one. The only way of destroying it is with high-temperature incinerators which Nigeria certainly does not possess," Mr Huismans said.

Details of the Nigerian deal are unknown, but big money was involved. Guinea-Bissau hoped to make \$120 million a year - more than its annual budget - by

agreeing to store industrial wastes but changed its mind as publicity over dumping practices spread.

Congo said five people it arrested for trying to illegally import one million tonnes of waste from Europe would have netted \$4 million from the deal.

Industries in the developed world are ready to pay hundreds of dollars per tonne to export waste. They can no longer dump it at home because of tight controls forced by environmentalists.

"The lobbying has resulted in more and more stringent controls on waste disposal but little on waste prevention. So it is being towed to countries where such stringent legislation does not exist," Mr Huismans said.

The 15,000 tonnes of ash from the municipal incinerator at Philadelphia dumped on Kassa by a Norwegian firm is not hazardous, according to US regulations.

In that case, Africans argue, why not keep it?

"What we cannot dump safely in our own backyard, we should not allow to be dumped unsafely in someone else's," European Community Environment Commissioner Stanley Clinton Davis said on May 19.

Noble sentiments, but Mr Huismans pointed out that only Belgium and Denmark of the 12-nation community had adapted their national laws to conform with the EC's own directive on dumping.

Developed Communist nations take little part in global discussions on the issue, so their record is unknown.

Poor African governments know, but may not publicly admit, that their bureaucracies are too weak and corrupt to stop the imports. "When an international convention does finally emerge," Mr Huismans said, "the onus will be firmly on exporting countries".

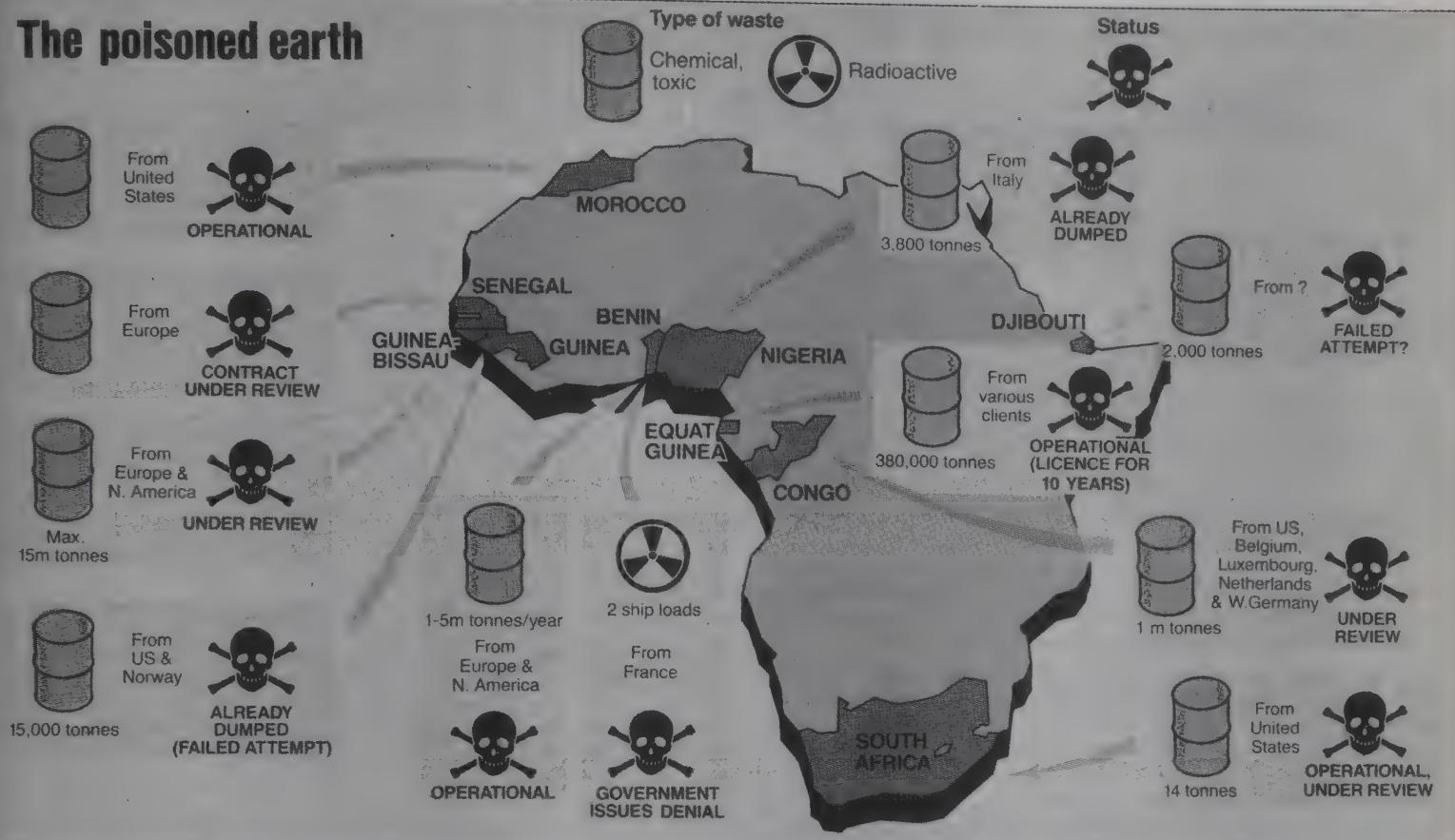
Nigeria has one possible solution to the problem. It has threatened to execute guilty importers.

The country's Nobel laureate for literature, Wole Soyinka, supported the threat on Tuesday. (Reuters)

Daily Nation,  
Kenya, 17.6.88

# THE DUMPING GROUNDS

## The poisoned earth



SOUTH August 1988

## Toxic waste dumped into sea

### TOXIC TERRORISTS DUMP WASTE OFFSHORE

SUCH is the row created over the dumping of toxic waste in Africa by the African governments, the environmental organisations and the African peoples themselves, that some waste-bearing vessels are simply dumping their poisonous loads in Africa's offshore waters. A cargo ship was spotted outside the territorial waters of Togo in the act of dumping its cargo into the sea.

Though some waste has been carried overland in large trucks, through Algeria, across the Sahara into Niger and Benin, ships are the most frequently used method of transport.

Recently boats flying the colours of Denmark and Italy were boarded at sea so that officials of two West African states could be reassured no toxic wastes were being carried. Some African officials have gone so far as stopping boats of the countries concerned, even if they have nothing to do with the toxic waste business, making them carry the trash, dumped by other nationals.

Benin at first used its own merchant marine vessel, the *Ganvié*, to carry wastes into the country. But local dockers have let the country's Head of State, General Mathieu Kérékou know that in future they'll refuse to

unload the boat if it again attempts to bring waste into Benin.

But now that African states are taking action – especially Nigeria, the Central African Republic, Benin, Congo and Equatorial Guinea – foreign boats may very well be offloading their cargoes directly into the Gulf of Guinea.

Countries like Togo and Benin, are concerned about the implications for their all-important tourist industries if toxic waste dumping in the sea continues.

It was revealed recently that Benin, unable to bury waste in the country's central regions it had contractually agreed to dispose of, was considering the burial of the waste on its borders with Nigeria (on the Ouémé river that feeds Lagos harbour) and with Togo (at the Lake Ahémé fishing village that is close to the town of Anecho in southern Togo).

Worse still was the discovery recently that Congolese authorities were considering the disposal of nuclear waste in *Les Gorges de Dioussou*, an important tourist site located not too far away from Pointe-Noire where the wastes would theoretically be offloaded at night and transported to the gorges by barge.

In all three cases, the disposal sites would probably contaminate



Toxic waste in Nigeria, locked away at Koko port.

local water resources.

Nigeria was so angered at the possibility that Benin might dump its wastes on its border that President Babangida has let it be known to General Mathieu Kérékou that if dumping took place the Nigerian army "would descend on Cotonou".

One important side-effect of the waste-dumping controversy has been the creation, in Benin, of Africa's first political opposition devoted primarily to ecological concerns. Called the *Mouvement Béninois pour la Liberté et la Démocratie*, this opposition group-

ing was partly responsible for the March 26 attempted coup against General Mathieu Kérékou. It justified its role in the coup attempt because Kérékou had chosen to turn the country, in the MBLD's words, into "la poubelle de l'Afrique" (the dustbin of Africa). Headed by Captain Adabaou Kossa, the MBLD said recently on the BBC World Service that it will not allow one more ounce of waste to be buried on Benin soil, and that General Kérékou will be the first head of state to fall victim of a well-organised ecological movement.

Paul Michaud

# Nigeria recalls envoy over Italian toxic waste

LAGOS, Fri. — Nigeria has recalled its ambassador in Rome in the strongest reaction so far by an African country to the dumping of toxic waste on its soil.

The military government, angered and humiliated by the discovery that more than 1,000 tonnes of Italian chemical waste had been dumped in southern Nigeria, summoned Italy's Charge d'Affaires in Lagos to the Foreign Ministry to announce its decision.

Nigeria said last night it had recalled its ambassador in Rome for consultations, a move which falls short of severing diplomatic relations.

It also asked the Italian government to remove without delay the foul-smelling drums and containers found in the tiny port of Koko in Bendel state last weekend.

The waste, including deadly dioxin poly-chlorobiphenyl (PCB), was shipped in several consignments from Italy since last Sep-

tember, according to *The Guardian*, the Lagos newspaper which exposed the scandal.

The thriving trade in dangerous waste, dumped in Africa for large amounts of money by companies in the developed world, first came to light last month.

Since then several poor countries including Congo, Benin, Gambia, Guinea and Guinea-Bissau have been linked to the lucrative traffic.

Newspapers have demanded to know how the consignments slipped past Port and Health authorities. They have openly suggested that bribes were made.

Police, who have sealed off the depot at Koko, are hunting the Italian and Nigerian businessmen suspected of arranging the deal.

The owner of the depot, Sunday Nana, said he was paid 500 Naira (about \$250) a month to store the waste by the white man who brought it. — Reuter

THE STAR  
SATURDAY, June 11, 1988

# Lagos to execute dumping culprits

LAGOS, Tuesday  
Nigeria prepared today to evacuate an isolated delta town where the military government alleged that radioactive waste from Italy was dumped.

It also threatened to shoot dead those found guilty of importing the waste, and warned that any foreigners involved in what it called the "inhuman conspiracy" would not be spared.

The threats made yesterday were the fiercest yet from Africa, where toxic chemicals are being dumped by companies in the developed world in return for cash.

Information Minister Tony Momoh, announcing 15 arrests so far, alleged for the first time that some of the containers discovered at the tiny port of Koko held radioactive matter.

He said the town in the delta region of Bendel State was being evacuated and that Nigeria was

seeking help from abroad to control contamination.

Mr Duro Onabule, the chief spokesman of Major-General Ibrahim Babangida, the military President, told correspondents that any suspect found guilty by a special tribunal would risk execution by firing squad.

"There will be no mercy on this issue," Mr Onabule said. "For foreigners convicted, the federal government will not be deterred by appeals from international communities," he added.

Meanwhile, Lagos has recalled its ambassador in Rome over the row and ordered Italy to remove the waste.

The Italian ship, *My Piave*, was detailed in Lagos on Friday. Mr Momoh said it would assist with the clearance.

Shipping sources said soldiers had boarded the *Piave* at the capital's Tin Can Island dock and were refusing access to visitors.

But the sources said the Trieste-registered vessel, which is

uninvolved in the waste trade, was too large to negotiate the creeks leading from the Gulf of Benin into Koko Port.

Mr Momoh said a total of 3,884 tonnes of waste was brought in five shiploads between August 1987 and May this year. His figure was twice the previous official estimates.

In Conakry, Guinea, two high-ranking officials have been arrested in connection with the dumping of toxic waste shipped from the United States, a senior police official said yesterday.

Fode Moussa Sylla head of Guinea's Criminal Investigation Department, named the culprits as Diallo Seydou and Richard Millimono, heads of department at the Trade Ministry. A third employee from the Ministry, Diallo Mamadou, was on official business in Italy and was sought by the government, Mr Sylla said. (Reuters)

## \$8mil in the dump

BEIRUT, Sat. Rome has agreed to pay US\$3 million (\$8 million) to send a ship to remove Italian waste dumped in Lebanon. Italian Ambassador Antonio Mancini said. Mr Mancini, who made the announcement after a meeting with Italian Prime Minister Bettino Craxi, said Italy would remove and destroy the toxic material to "save Lebanon and the Mediterranean region from these dangerous substances." Official sources said 2,411 tonnes of foul-smelling waste had been dumped in Lebanon since last September. — Reuter

New Sunday Times, Malaysia, 3.7.88

## Norway to remove toxic waste from Guinea

ABIDJAN (Guinea), Mon. — Norway has agreed to remove 15,000 tons of toxic waste dumped on the Guinean island of Kassa, starting on June 25, Guinea State Radio announced yesterday.

According to the broadcast, monitored in Abidjan, the Norwegian Ambassador told Guinean officials of the decision at a meeting over the weekend.

Ambassador Kjel Oestrem, resident in Abidjan, arrived in Guinea on Friday following the arrest by Guinea of Norwegian Consul-General Sigmund

Stromme for alleged complicity in the dumping.

Mr Stromme is also director of the joint Norwegian-Guinean company Guinomar which imported the waste. The company said it was to be used in the making of bricks.

Guinea Radio said the Norwegian consul was not likely to be released soon because he was "the brains behind this affair."

The dumping of the waste on the off shore island of Kassa was revealed following reports that it had killed some of the island's vegetation. — AFP

The Star, Malaysia, 14.6.88

## Consul admits guilt

CONAKRY, Wednesday

NORWAY'S Consul-General has confessed to forging documents to illegally store 15,000 tons of industrial ash containing toxic chemicals in an island near here, the Guinean Radio said.

Five Guineans have also been arrested and a sixth has fled in the scandal that followed the discovery of an illegal toxic-waste dump on the Island of Kassa, across from the capital, Conakry, the Radio said.

The Consul, Sigmund Fromme, was arrested Saturday and is likely to go on trial, the Radio said.

It was a company he heads, Guinomar, that arranged to ship and dump the ash

— AFP

# Dirty games in Brussels



European firms accused of dumping dangerous toxic waste in Africa are unlikely to face any legal action at home. European Community officials stress that although the companies are engaged in "morally reprehensible activities", they have not broken any EC rules and cannot be brought to justice.

The EC's powers to deal with the issue are extremely limited. Despite repeated demands by environmental lobbyists, backed by the ecology-conscious Dutch government, toxic waste exports are not banned by the 12 EC member states. An attempt to introduce such a ban failed at a meeting of EC environmental ministers in Luxembourg on 29 June because Britain's junior environmental minister, Colin Moynihan, successfully opposed the bid by his Dutch counterpart, Ed Nijpels. The British argument was that the final choice about whether to accept the waste should be left to the recipient state and that to stop the trade unilaterally would amount to "commercial colonialism".

The EC tries to "regulate" the toxic waste trade through two patchy directives. The first of these, issued in 1984, is designed to ensure that Third World countries are not tricked into receiving

toxic waste by unscrupulous operators: waste-exporting companies must notify governments in the receiving countries of the hazardous nature of the waste.

Under the terms of the second directive, dating back to 1986, exporters must ensure that countries receiving the waste have the technical capacity to deal with it. The problem is, however, that only Denmark, Greece and Belgium have so far implemented the directives. Others are in the process of doing so, but it could be years before the regulations enter into force.

Companies that have sold – or tried to sell – toxic waste to Guinea-Bissau, Congo, Benin and Nigeria are clearly guilty of violating both EC directives.

But, "since the EC has no army, no action against the firms is possible," an EC expert says.

The Community is also putting some of the onus for stopping such dumping on African governments. Countries that suspect they may be manipulated by dishonest operators should turn to the EC for "technical assistance".

In recent years Britain has become a significant reprocessor of other countries' radioactive waste, and many of the front companies in the toxic waste shipment business choose to operate out of the UK.

British experts from the Harwell environmental safety centre sent to analyse the toxic waste dumped at Koko in Nigeria were contracted by the British government's overseas development administration. ■

**Shada Islam in Brussels and Patrick Smith**



● Moynihan: beating off a ban

# Efforts to control export of toxic wastes

By Special United Nations Service

THE EFFORTS to negotiate and conclude an international convention to control the transboundary movement of hazardous wastes is making progress, though many technical issues still remain to be solved, officials of the United Nations Environment Programme (UNEP) have reported.

Legal and technical experts trying to prepare a draft convention on this subject held a second round of meetings early June, 1988 at Caracas in Venezuela and another meeting is to be held in September, at a time and place yet to be decided. The first meeting was at Geneva in February.

The United Nations Environment Programme which is sponsoring the move for an International Legal Convention is still hoping that the diplomatic conference to conclude such a treaty could take place in March 1989 at Basel in Switzerland.

While the Caracas meeting was at a legal and technical level, the meeting took place even as world media attention was focused on dumping of toxic wastes in African countries by European enterprises, and this had its impact on the meeting, according to Dr Jan

Huismans, the UNEP official in charge of the international registry of potentially toxic chemicals.

Huismans said that European and North American entrepreneurs find themselves more and more under pressure to get rid of the wastes resulting from the industrial processes in the chemicals and other industries. This is resulting in efforts to ship the wastes and dump them elsewhere, as has recently been reported from Africa. 'And this situation was very much with us when we had the second meeting of the expert group in Caracas,' Huismans said.

The issue itself is relatively new on the international agenda. It was only in 1985 that OECD countries agreed to develop a policy for gradual international controls on the movement of hazardous wastes. Sometime earlier, the EEC had issued a directive on the problem to its member-states.

In 1987, the UNEP governing council mandated the executive director to develop an international convention. After a planning meeting that year in Budapest, the expert group had its first meeting in Geneva in February,

1988 and its second meeting at Caracas in June, 1988. The UNEP secretariat has prepared a text of a draft convention which the experts are examining.

In the discussions so far there is no disagreement between the exporting and importing countries on the need for full exchange of information and for importing countries to give written prior consent before 'hazardous' wastes are sent to the importing countries.

There is also agreement that the information to be exchanged prior to the export should relate to the nature of the waste, quantities and number of shipments and evidence that the waste would be going to a treatment or disposal facility that would have the capacity, and the license to deal with that particular waste. A mere agreement of the importing country that the waste could be sent would no longer suffice. The importing country must show evidence of its capacity to deal with the waste.

One problem relates to the definition of 'hazardous' wastes. Many industrialised countries have legislations on this subject, but there is no harmony in such legislation. What one country considers 'hazardous' is not so listed in another country. And while this is proving a problem even within the EEC or within the OECD, the problem is greater in Third World countries, most of whom have no legislation at all or even the expertise.

This issue was controversial at the February 1988 Geneva meeting but is no longer so, according to Huismans. There is now agreement on what hazardous wastes should be controlled by the convention. A complicated definition has been negotiated in the expert group, but it still needed further discussion.

There would be a core list of 44 waste materials that all parties to the convention would consider to be 'hazardous wastes', irrespective of the national legislation in any particular country that would become a contracting party to the convention.

Another controversial issue, and one yet to be resolved, is the question of defining 'disposal'. Some countries want the term 'disposal' to mean also recycling or re-use operations for re-distillation of solvents etc. But others would exclude these activities from the term 'disposal' to be covered by the convention. Some of the countries feel that even if wastes are 'hazardous', they should not be so considered if they could be recycled or alternative uses found for them. But experts from other countries do not accept this view. This issue is still under examination.

Another issue concerns the right of 'transit' countries. While there is now agreement that the prior written consent of the importing country must be obtained, there is no such agreement about the consent of the 'transit' country through which the 'hazardous' waste is being sent by an exporting country to an importing country.

After considerable discussions, the industrialised countries have agreed to the concept of 'prior tacit consent' of the transit country. An exporting country would send advance notification, of a fortnight or so, and if the transit country does not expressly refuse permission, the permission to transit would be assumed to have been granted. At Caracas a number of Third World countries objected to this, and said if no reply is received it should be presumed to mean refusal of transit consent.

In relation to the proposed con-

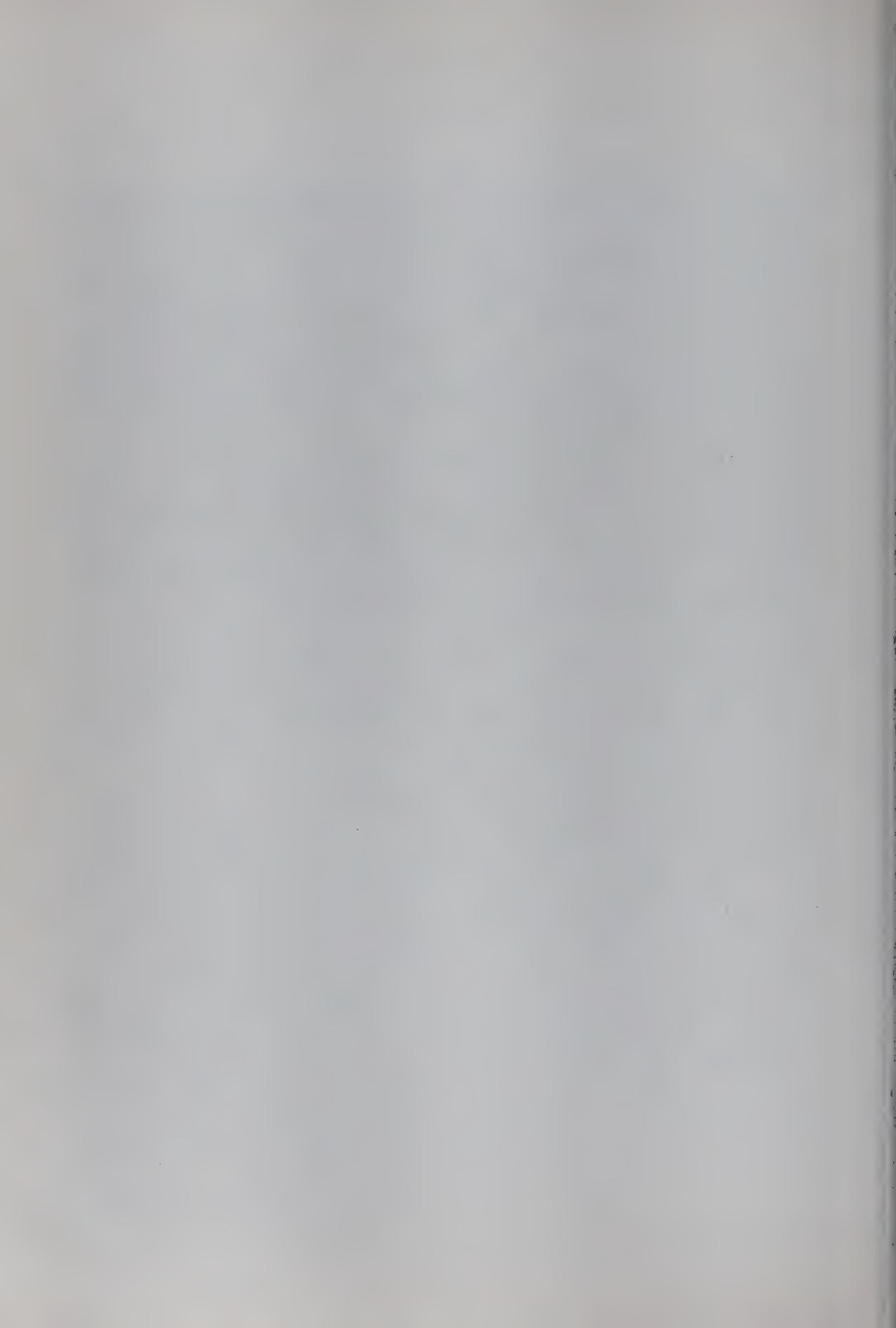
vention, Third World countries underlined the complexity of the entire issue for their countries and the relative unawareness and unpreparedness of their countries to the entire range of problems and issues posed by hazardous wastes and their treatment and disposal.

Third World countries would need technical assistance, support information and transfer of technology to deal with the problem and participate as equal partners in the implementation of the convention. Any international convention on the issue, and the institutional machinery to be created, should have provisions for providing technical assistance and help.

While experts from the industrial

countries reportedly agreed in principle to this, there was reluctance to commit themselves over the budgetary implications of such a provision. According to UNEP officials, even if everything goes according to plan and the draft convention is negotiated and concluded at the diplomatic conference in March next year, it may take some years before the convention becomes effective and comes into force.

Third World countries feel that even ahead of the entry into force, an interim institutional setup should be envisaged and provided for, and the necessary financial and budgetary resources provided for it, to enable provision of technical assistance to Third World countries.



**Part II**

# **LESSONS FROM FIRST WORLD**

# A Problem That Cannot Be Buried

*The poisoning of America continues*



The great toxic-waste mess oozed its way into the nation's consciousness, and its conscience, a little more than five years ago. "An environmental emergency," declared the Surgeon General in 1980. "A ticking time bomb primed to go off," warned the Environmental Protection Agency. The reaction was typically all-American: Congress created a grand-sounding "Superfund," a \$1.6 billion, five-year crash program designed to clean up thousands of leaking dumps that were threatening to contaminate much of the nation's underground water supplies.

Last week that law expired, a victim of wrangling among the Senate, the House and President Reagan over how much more should be dedicated to the cause and who should pay the bill. During its existence, the Superfund dribbled away most of its money on a mismanaged effort that served only to reveal the almost unimaginable enormity of the task ahead. Though Congress is likely to reach an agreement by next month on a new infusion of money, anywhere from \$10 billion over five years (the House proposal) to \$5.3 billion (the Reagan Administration's figure), for now the once ambitious program lingers in limbo.

Meanwhile, fears about toxic wastes continue to grow. Each day more and more communities discover that they are living near dumps or atop ground that has been contaminated by chemicals whose once strange names and initials—dioxin, vinyl chloride, PBB and PCB, as well as such familiar toxins as lead, mercury and arsenic—have become household synonyms for mysterious and deadly poisons. "The problem is worse than it was five years ago," contends New Jersey Democrat James Florio, who as a Congressman from one of the most seriously contaminated states became the key author of the 1980 Superfund law. "It's much, much greater than anyone thought." Concedes Lee Thomas, the third director of the scandal-tarnished EPA during the Reagan Administration: "We have a far bigger problem than we thought when Superfund was enacted. There are far more sites that are far more difficult to deal with than anybody ever anticipated." That comes as no surprise to Barry Commoner, the venerable environmental gadfly. Says he: "We are poisoning ourselves and our posterity."

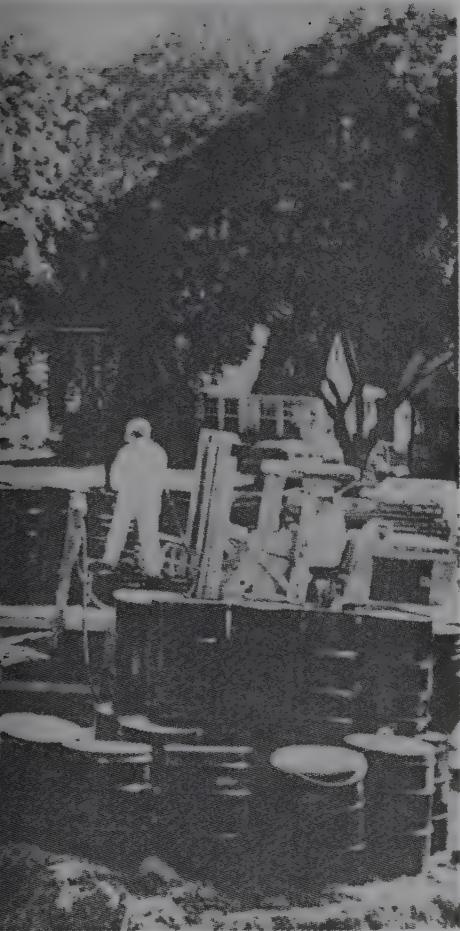
The growing awareness of the vast scope of the toxic-waste problem has bred much public anguish but precious little remedial action. The Office of Technology Assessment, a research arm of Congress, contends that there may be at least 10,000 hazardous-waste sites in the U.S. that pose a serious threat to public health and that should be given priority in any national cleanup. The cost, OTA estimates, could easily reach \$100 billion, or more than \$1,000 per U.S. household. Eventually, predicts the General Accounting Office, which also does studies for Congress, more than 378,000 waste sites may require corrective action. So far the EPA has put only 850 dumps on its priority list



Lifting refuse from a dump near homes in M



Liquid chemicals form a stew of poisons that fill a pond in Denver's Lowry Landfill



too often there is nowhere to go



Checking for contamination levels during cleanup of a waste-storage site in Greenup, Ill.

(see map). In its five-year effort, it managed to clean up only six sites and, critics protest, not very thoroughly at that.

The U.S. faces other grave environmental risks: acid rain, smoggy skies, radioactive wastes and lethal gases escaping from industrial plants. Over the past five years, the EPA reported last week, mishaps in the handling or production of chemicals have caused some 1,500 injuries and 135 deaths. But the disposal of dangerous wastes is clearly the most pressing concern. Toxic dumps where steel drums have been left to rust and leak, letting poisons seep into the earth for decades, are scattered in virtually every county of every state. They present a potentially irreversible threat to water supplies, public health and the economy.

Why has so little been accomplished in attacking the chemical-dump mess? "If we're looking for people to blame, well, the woods are full of them," says William Ruckelshaus, who helped launch EPA as its first director during the Nixon Administration, and who was recalled by Reagan in 1983 to try to repair the agency's image.

Most critics direct their anger at the current Administration. William Drayton, chairman of a Washington-based environmental-safety group, says it took "an enormous movement in American history" to develop a national consensus that "this

country is going to provide public health protection against chemical contaminants." But what followed, charges Drayton, who served as assistant EPA administrator under President Jimmy Carter, was "a classic Greek tragedy: enter stage right the Reagan revolution with its enormous ideological antagonism to regulation of any sort. You have a leader who just doesn't understand what all those Latin-named chemicals are and what they do. On this subject he just stopped learning." Says Douglas Costle, Carter's EPA director, of his successors at the agency: "They just flat-out didn't realize they had a tiger by the tail until it bit them in the ass."

In the Administration's defense, Ruckelshaus argues that "the Government had never done anything like it before, starting from absolute scratch to deal with this terribly emotional mix of issues. The fact that there were mismanagement, false starts and mistakes was inevitable." But even he admits that the agency's performance on toxic wastes "didn't have to be as bad as it was."

There is little doubt that EPA has seemed feckless and confused. For one thing, its critics contend that less than 20% of the original \$1.6 billion Superfund allocation has been spent on actual cleanup of waste sites. The National Campaign Against Toxic Hazards, an umbrella group of grass-roots activists, claims that less than 10% of the 850 sites on EPA's current priority list have received any remedial attention at all in the program's first five years. At that pace, according to the group, "millions of Americans will wait decades for the EPA to clean up their poisoned communities."

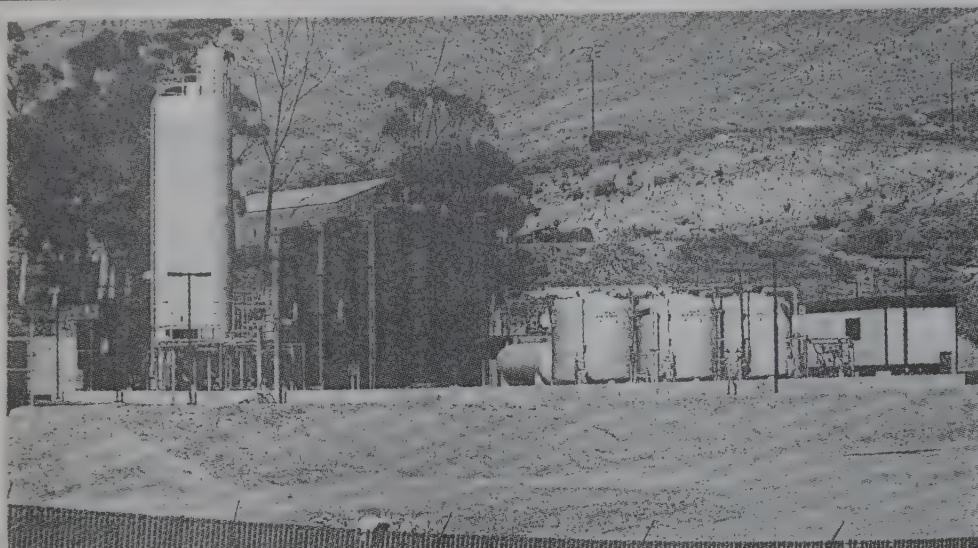
Apart from actual cleanup, EPA is responsible for monitoring sites suspected of endangering underground water supplies, so that the citizens who draw such water can be warned of the health dangers. But a congressional research team concluded last April that of the 1,246 hazardous-waste dumps it surveyed, nearly half showed signs of polluting nearby groundwater. The EPA's monitoring of these sites, the study charged, was "inaccurate, incomplete and unreliable."

The congressional watchdogs claim that when EPA finally does tackle a waste site, it seeks only a stop-gap solution to the chemical seepage. When a dump is cleaned up, its wastes are often merely shifted to other locales, "which themselves may become Superfund sites," the OTA report says. "Risks are often transferred from one community to another and to future generations."

A poll taken last month for TIME by Yankelovich, Skelly & White, Inc., shows that 79% of Americans say that "not enough" has been done to clean up toxic-waste sites. More surprising, when asked, "Would you be willing to pay higher state and local taxes to fund cleanup programs in your area," 64% answered yes (34% said no, 2% were unsure).

This attitude toward the slow pace of dump cleanups is part of a broad public sense that Government is failing to re-

# United States



SMITH-WHEELER PICTURES

were pumped into a 3,400-ft. well lined with two cement walls. EPA considers the golf course cleaned up, as indeed it seems to be. In one sense, however, the problem was merely transported across the river. All that soil has been deposited on the plant's property, where a bigger cleanup job has been completed.

Two of the six sites chosen by the EPA for quick action should probably not have been on the top-priority list in the first place. In Greenville, Miss., Walcott Chemical Co. had stored 226 drums of such chemicals as tetrasodium pyrophosphate and formic acid in a warehouse that the state of Mississippi had seized for failure to pay taxes. The state considered the chemicals a fire hazard (rather than a contamination threat) and asked EPA to put the site near the top of its list. The agency merely had the drums hauled off to an approved landfill in Emelle, Ala. Problem solved. Similarly, about 700 drums of chemicals had been stored in a Cleveland warehouse used by Chemical Minerals Recovery Co. Another 700 were piled outside the building. None had sprung significant leaks. But EPA gave the site priority and had the drums carried to an EPA-licensed landfill in Geneva, Ohio. Another site cleared.

However, what about the residents of Emelle and Geneva? Have they inherited the old headaches of Greenville and Cleveland? Perhaps not immediately, since the dump at Emelle sits atop hundreds of feet of clay, and the one at Geneva at least has the now mandatory clay liner. But most experts consider any landfill only a temporary solution to the chemical-waste problem. Eventually, all will develop cracks or gradually give way to the corrosive action of the potent chemicals.

Six California environmental groups recently surveyed seven landfills in that state. Though the EPA was monitoring them for leaks, the groups reported, "every one of the sites examined is leaking, without exception; and every one is out of compliance with currently applicable regulations." Wastes placed in them from other failed sites may soon have to be picked up and moved once again. The result is a bleak game of chemical leapfrog.

The spreading realization that there is no easy way simply to bury the toxic-waste problem has fed the ever present NIMBY (not in my backyard) syndrome. "Something's got to give," protests Christopher Daggett, EPA administrator for New York and New Jersey. "Either we aren't going to have cleanups, or someone's going to bite the bullet and start accepting wastes. But

California's Stringfellow Acid Pits and new filtration plant to help eliminate the hazards

spond adequately to environmental concerns in general. Some 45% of those polled said that current laws to protect the environment do not go far enough, while 29% are satisfied with them and 16% think they go "too far." Fully 63% feel that even the inadequate governmental protections are not being enforced strictly enough by the agencies involved.

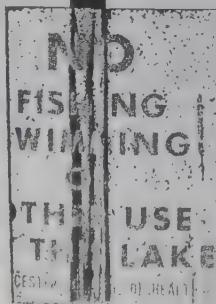
Some critics contend that putting off the admittedly expensive cleanup effort will mean greater expense in the future. "Delay not only prolongs the time that people are exposed to toxic hazards," says Michael Podhorzer, director of the National Campaign Against Toxic Hazards. "But every day it means that more toxic chemicals are released into the soil, air and water. The longer we wait, the greater the damage will be and the higher the final cleanup cost will be."

Consider the meager six sites deemed to have been cleaned through the Superfund. After a nine-month-long spill of chemicals into the Susquehanna River starting in 1979, it was found that a small Pennsylvania company had been systematically, and illegally, dumping toxic wastes into shafts that fed into the Butler Tunnel, an outlet for waste water from abandoned coal mines near Pittston, Pa. Three men were convicted of violating the state's Clean Streams Act, and one was sent to prison. The three and their company were fined \$750,000. EPA supervised the cleanup of the river pollution, and in 1982 it took the site off its priority list. But heavy rains from Hurricane Gloria sent 100,000 gal. of oily, smelly chemical wastes rushing back up to the surface of this presumably cleaned-up site and into the Susquehanna.

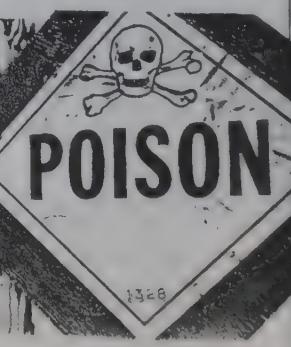
"There was an extremely strong odor that would burn your nostrils," said City Clerk Paul McGarry, who went to investigate after residents began phoning with complaints. "It looked like liquid tar."

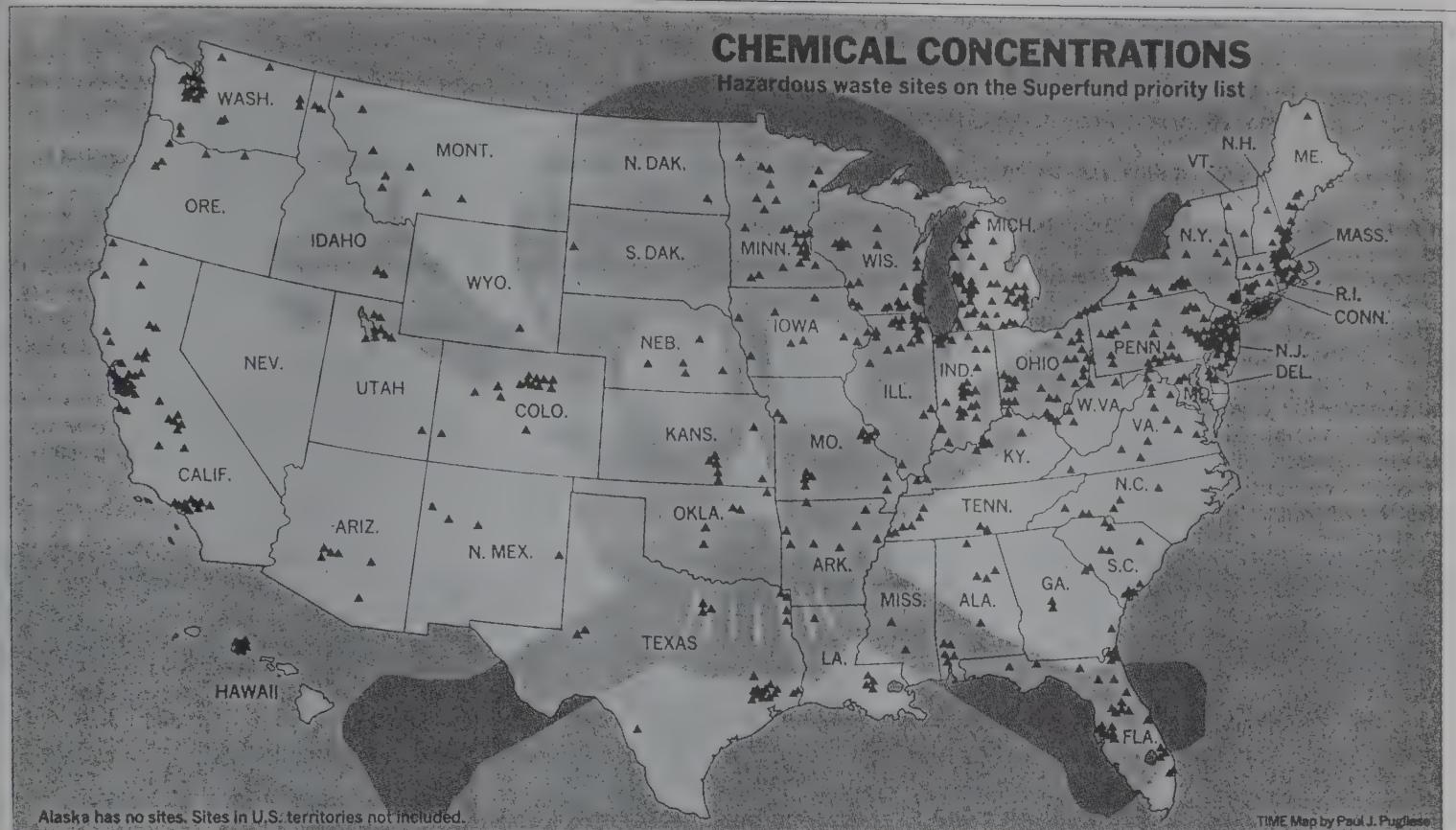
Another of the six sites that EPA claims to have successfully cleaned is in Baltimore, where strong acids and *aqua regia*, one of the most corrosive liquids in existence, had been stored throughout the 1970s. For years, residents in 20 row houses along Annapolis Road complained of eye, nose and throat irritation; eight people were burned in July 1979 when chemicals leaked into a playing area. EPA removed 1,500 drums and scraped off up to twelve inches of topsoil. The land was sloped and sodded and declared fit for a playground. But critics cite tests showing that the contamination had worked its way as far as 15 feet below the surface. No attempt was made to prevent seepage of these deeper chemicals into the groundwater or a nearby river.

For some 40 years, beginning in the 1930s, the Velsicol Chemical Co. (formerly the Michigan Chemical Co.) had dumped and burned toxic industrial chemicals on a 3.5-acre site along the Pine River near St. Louis, Mich. A county golf course was developed beside the dump. By the mid-'60s, fish in the river contained high levels of such known or suspected carcinogens as PBB, PCB and DDT. Working with EPA, the company in 1982 agreed to spend \$38.5 million to clean up the area. At the golf course, all soil was removed to a depth of 3 ft. below any signs of contamination. That involved hauling 68,204 cu. yds. of dirt away. Fully 1.25 million gal. of contaminated groundwater



HE WATER, FISH AND SOIL OF  
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TO HUMANS AND ANIMALS  
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1982





Lord knows, no one wants to be first." Daggett and his boss, EPA Director Thomas, contend that there is no ready technology that can promptly solve the disposal problem. "We can't wait around until we have the ultimate answer," says Daggett. "This stuff is still being generated, and we have to deal with it today. So, yes, we are going to put it into landfills that may leak someday. But give me an alternative. Do you want me to store these wastes in drums all over the country?"

Critics accuse EPA of being too cautious in failing to rely more heavily on such destruction technologies as high-temperature incineration and in failing to back innovative approaches for detoxifying chemical wastes (see box). EPA has projects under way in these fields, but the pace is slow, the funding inadequate, and there is little sense of urgency. Barbara Vecchiarelli, a citizens'-group leader in Marlboro Township, N.J., admires Daggett's dedication to his work but, nonetheless, complains about EPA in general: "They don't have the technology to handle chemical pollution. The problem is bigger than they are, and they're afraid to admit it to the American people."

Part of the problem with EPA's management of the Superfund over the past five years stems from Reagan's initial choice of top officials who were ill-prepared to han-

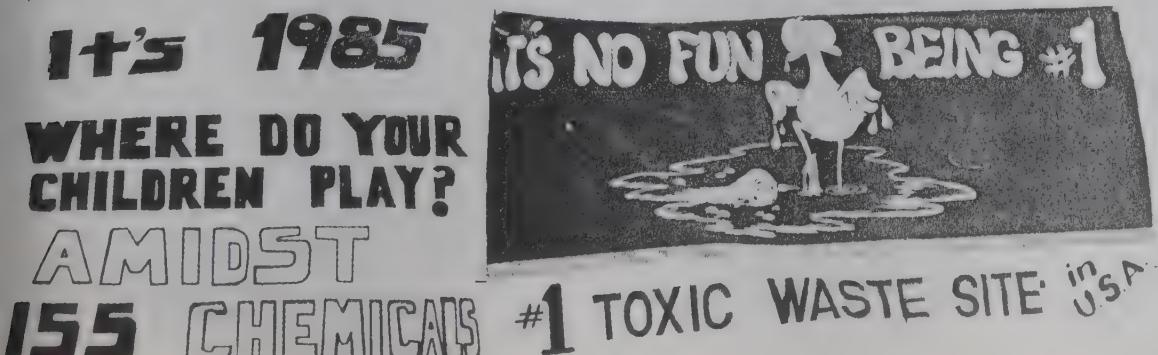
dle the difficult mandate. Anne Burford, a Colorado lawyer and Republican Party fund raiser, was tapped in 1981 to head EPA; at White House urging, she approved the selection of Rita Lavelle, a California publicist who had worked for a chemical company (Aerojet General Corp.), to direct the Superfund start-up. In the mismanagement that followed, Lavelle was convicted of perjury for denying any involvement in EPA's dealings with the Stringfellow Acid Pits, a notorious waste dump in California, where Aerojet General, along with many other companies, had dumped tons of caustics, cyanides and heavy metals over the years. Burford was also charged with contempt of Congress for refusing to give it some internal EPA documents; the charge was dropped after she quit in March 1983.

**W**hile EPA was floundering, the White House imposed drastic funding cuts, resulting in the loss of 23% of its budget and 19% of its employees by 1983, even though the toxic-waste work load was multiplying. When Ruckelshaus was named EPA chief after Burford's resignation, he managed to rebuild the staff's morale, restore some of its funding and give his successor a stronger hand. Thomas, the former head of the Federal Emergency Management Agency, has worked

hard at getting EPA into gear. "He kicked the tires and punched the fender and said, 'Let's get this thing moving,'" notes former EPA Chief Costle.

But where is EPA going on toxic wastes? "We've learned that we have a far bigger problem than we thought when Superfund was enacted," Thomas concedes. "But we have a good bit of momentum now. I don't see how anybody could come into this agency and run it faster than we've tried to run it over the past couple of years." He can point to the fact that EPA is currently trying to stop the spread of pollution at about 200 sites and is preparing to tackle a cleanup of about 200 others. By next year, he predicts, "we'll be managing nearly a thousand sites at the same time."

The new emphasis at EPA has been logical enough: stop the seepage of pollutants and protect drinking water first, get rid of the toxic stew later. When a number of wells in Sag Harbor, on New York's Long Island, were found contaminated, EPA moved swiftly to have two dozen affected homes hooked up to a city water system. "The longer-term problem isn't solved," says EPA's Daggett. "But we were able to remove the immediate threat." In 1981 poisons were discovered in 27 of 30 wells serving Battle Creek, Mich. An elaborate system of purge wells was created to pump the contaminated water out of



## United States

its underground plume and purify it. Now Battle Creek has 16 clean wells from which to drink.

Finally, acting on a law passed by Congress in 1976, EPA has issued tough regulations designed to trace the flow of toxic chemicals from their manufacture to their eventual disposition, creating a paper trail that should discourage illegal dumping and pinpoint responsibility when contamination occurs. The agency has also vastly tightened its licensing requirements for anyone operating a landfill that is permitted to accept hazardous wastes. By early next month, all such landfills can continue to operate only if they have double liners to prevent seep-

were merely poured into noxious surface lagoons. (In other ways, Waste Management is no ideal disposer. It agreed to pay \$2.5 million last April to settle an EPA charge that it had illegally disposed of toxic chemicals in Ohio.)

Such techniques are, of course, expensive. But the increasing cost of getting rid of dangerous chemicals provides a powerful incentive for manufacturers who use them to find ways to recapture and recycle them. While Government pressure and supervision of toxic-waste sites are vital, the disposal problem will remain intractable unless industry does most of the job itself. By one estimate, 96% of all hazardous wastes never leave the proper-

are being used in the U.S.; EPA has classified 60,000 of them as potentially, if not definitely, hazardous to human health. They have been dumped or buried for years on the plausible but, as it turned out, tragically wrong theory that they would lose their toxicity during the decades it would take them to drift through layers of soil and rock into deep water supplies. There is no way to remedy in a few years at least a century of such misguided, if innocent, practices.

Shuffling wastes from one leaking site to another that may soon turn porous may seem absurd, but there is no way to eliminate all landfills as short-term disposal necessities. The same is true of the use of



In Illinois, wastes are stored in holding tanks and cleansed of toxins for safe recycled use

age. Already, wells must be bored in the surrounding area to detect any signs of spreading contamination. Although clearly a necessity, the new rules may take half of the nation's 2,000 licensed disposal sites out of operation, further aggravating the problem plaguing chemical-waste planners: nowhere to go.

A prime example of a modern disposal facility is the one operated by Waste Management, Inc., at its C.I.D. Hazardous Waste landfill in Chicago. A giant excavation 35 ft. deep covers two acres. A floor of compacted clay approximately 40 ft. thick has been laid below the bottom of the hole. On top of this virtually impermeable bed, workmen are placing a plastic liner to be topped by a plastic-grid system that will collect and direct any seepage into a series of sump pumps. Above the grid will be another plastic liner, another layer of clay and yet more plastic. A plumbing system will pump rainwater out of the area. Nearby, the company is spending \$1.6 million to improve its large surface collection tanks, made of concrete lined with epoxy, that receive waste from steel-processing plants. New fiber-glass liners are being placed inside the cylinders. In the past, such wastes

ty of the companies that produced them.

A number of companies have made some headway in curbing a generation of the poisons. Minnesota Mining & Manufacturing Co., for example, cut its volume of toxic wastes in half, partly by switching from solvent-based glues to water-based glues in its manufacture of adhesive tape. It also burns nearly all of the remaining wastes in a huge incinerator at Cottage Grove, Minn. "In the past five years, there has been a tremendous change in the attitude of the chemical industry about hazardous waste," says Larry O'Neill, an environmental official with Monsanto Co. in Missouri. "We are now generating less and recycling more." Still, the recovery techniques are just being developed. "When we talk about recovery, we're only talking now about 1% of all the material that's generated," claims James Patterson, director of industrial-waste-elimination research at the Illinois Institute of Technology. Even 1%, however, does add up.

If the public clamor for quicker, more effective action in the war on toxic wastes is fully justified, the expectation of easy or fast fixes is not. Some 66,000 chemicals



Federal EPA Director Lee Thomas



EPA Critic, Congressman James Florio

hazardous-waste incinerators. While they risk befouling the air, they are nonetheless a necessary temporary expedient.

Much more might be done, however, to find new methods of taking the poisonous punch out of hazardous chemicals. The EPA spent only \$43 million in the first five years of the Superfund program on basic research and development of such techniques. According to the Office of Technology Assessment, as much as \$50 million a year could be spent usefully on R. and D.

In the end, only a vast effort by the industries that profit from the chemicals can get the waste mess under control. That would undoubtedly mean added costs passed on to the consumer, but the basic fact is that the effort must be made. Wondrous chemical potions have been a great aid to mankind, easing pain, alleviating disease, prolonging life, spurring food production and serving as the catalyst for countless useful products. But once discarded, many of these concoctions, or their by-products, turn killer, and the U.S. has no choice but to curb their lethal ways.

—By Ed Magnuson

Reported by J. Madeleine Nash/Chicago, Peter Stoler/New York and John E. Yang/Washington



Gamma-Liaison

*Anger and jubilation: Love Canalers protest government inaction; their leader Lois Gibbs (right) celebrates with champagne*



## Fleeing the Love Canal

**A**t the headquarters of the Love Canal Homeowners Association in Niagara Falls, N.Y., they poured champagne. "You can go with your families tonight and get a good night's sleep in a nice clean environment," said association president Lois Gibbs. But for many residents of the chemically contaminated Love Canal area, word that the government had finally agreed to move them temporarily seemed more of an occasion for small beer than bubbly. They wanted to leave and never come back. "If the United States has enough money to get the Cubans out of Cuba, they should have enough money to get us out of the Love Canal," one resident screamed to a tumultuous meeting at a neighborhood church.

The odd mixture of jubilation and anger was understandable. For years, the Love Canal families lived next to a toxic time bomb where the Hooker Chemicals & Plastics Corp. had dumped 21,000 tons of noxious wastes. The residents became convinced that they were subject to an increased risk of cancer, seizures, miscarriages, birth defects and other disorders. Two years ago, government officials had declared a "health emergency" and relocated the 237 families living closest to the contamination site. Among the remaining 710 families, anxiety mounted steadily. And last week, fear turned into near panic when the Environmental Protection Agency revealed a report indicating that some residents had damaged chromosomes, further raising the specter of cancer among the living and unpredictable damage to future generations.

Government officials seemed oddly unprepared for the furor caused by the re-

port. Since 1978, authorities had been trying to decide whether the danger at Love Canal warranted total evacuation of the area. The chromosome study, admittedly a "fishing expedition" according to one official, was commissioned to gather evidence in a \$124 million Federal suit against Hooker Chemical. The EPA intended to decide whether to relocate the remaining families only after the study had been reviewed by geneticists. But when word about the broken chromosomes leaked, the agency hastily made the results public. Biogenics officials caused further outrage when they informed residents who took part in the study of the results in the most offhand manner. "They just said my chromosomes were abnormal and handed me a letter," said Patricia Sandonato.

If EPA still hadn't decided about relocation, the distraught Love Canalers had no trouble making up their minds. Association president Gibbs fired off a telegram to President Carter: "Don't let our people get lost in a sea of red tape as we watch our babies fighting sickness and growing up into an uncertain future." To force the government's hand, two EPA officials were held "hostage" for six hours in the association's headquarters while 250 outraged residents marched outside. Finally, President Carter signed an emergency order permitting temporary relocation. The Federal Emergency Management Agency agreed to release \$3 million to \$5 million to put the Love Ca-

nalers up in motels, hotels and other quarters.

Until the FEMA worked out a voucher system to reimburse local motels, some residents couldn't move. "We're all poor, that's why we live here," said one occupant of a public housing project. A few who could afford the bill were turned away when motel managers learned that they lived near the Love Canal. One man got a room by feigning a Southern accent. No one wasted any time moving. "I'm not going to stay here a day longer," said Edmund Pozniak as he checked into Castle Motor Inn, "and I'm never going back again." Many residents protested the temporary relocation and insisted that the government buy out their homes so that they could move for good. "I want a fair market value for my house and to get this nightmare over with," said Jo Ann Kott, who had suffered a miscarriage and a stillbirth.

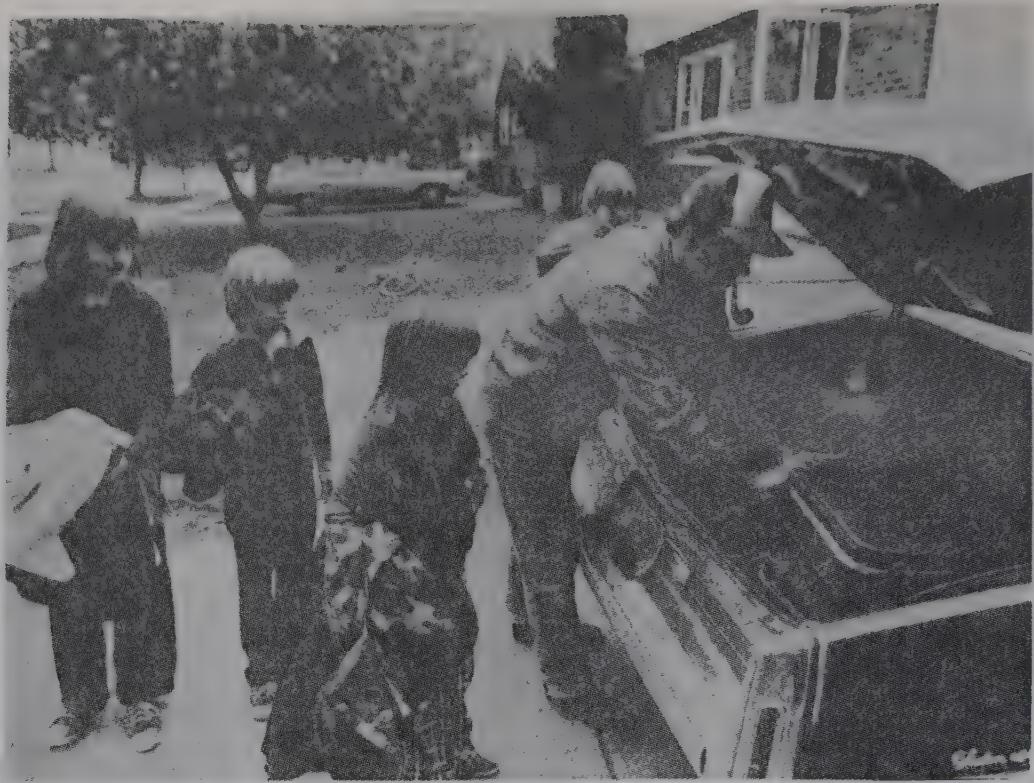
**Risk:** Other Love Canal women have shared Mrs. Kott's nightmare. Two years ago, state health officials reported a 50 percent higher risk of miscarriage among

women there. Biochemist Beverly Paigen of Roswell Park Memorial Institute in Buffalo conducted a survey that showed a rise in birth defects. Of seventeen pregnancies in polluted areas last year, only two babies were born normal. There were four miscarriages, two stillbirths and nine babies with defects. Paigen has also recorded problems among adults, including seizures and depression.

Evidence of neurological damage among Love Canal

### Viewing the damage





Photos by Joe Traver

*Ending a nightmare: Jo Ann Kott's family packs up and heads for a motel*

residents turned up by Paigen helped force the relocation decision. Paigen and Dr. Stephen Barron of the State University of New York, Buffalo, found that the speed with which electrical impulses traveled along peripheral nerves among 35 Love Canalers was slower than it was among volunteers living outside the region. Paigen concluded that the residents had undergone nerve damage, possibly caused by chemical exposure.

**Gap:** The chromosome study that touched off the Love Canal rebellion is medically controversial. Carried out by the Biogenics Corp., a private lab in Houston, on samples of white blood cells from 36 residents, it reported significant chromosome abnormalities in eleven subjects, a far higher proportion than would be expected. The aberrations included "ring chromosomes," which occur when the ends of a chromosome break off and the remaining portion closes to fill the gap, and "supernumerary acentric chromosomes," an ambiguous term for pieces of broken chromosomes. The report said that "chemical exposures at Love Canal may be responsible for much of the apparent increase in the observed cytogenetic aberrations and that the residents are at an increased risk."

When experts sought to review the study, a series of puzzling events occurred. A party of geneticists dispatched to Houston by EPA to look over the testing procedures at Biogenics was turned away. The firm's scientific director, Dr. Dante Picciano, protested that the group included a New York State researcher, which to him "smelled like a cover-up." Subsequently, specialists did see the report and found serious flaws.

The scientists criticized the study because it didn't include blood samples from

people living outside the Love Canal area for comparison. They noted also that those chosen for the study already suffered from identifiable health problems, such as a history of miscarriages, that might not be related to chemical exposure. The Biogenics researchers did not report whether the participants had been exposed to X-rays, drugs, viral infections or other sources of chromosome breakage. The panel questioned the significance of the abnormalities listed in the report. Chromosome fragments such as those described may result from exposure to noxious agents, but don't by themselves indicate a health threat. "They are not per se harbingers of cancer, birth defects or miscarriages," says Dr. Arthur Bloom of Columbia-Presbyterian Medical Center in New York.

Despite the panel's skepticism, government health officials decided to move out the Love Canalers. They cited particularly the evidence of increased miscarriages and the birth of low-weight infants reported in other surveys. "While it is hard to get a cause-and-effect relationship for any specific disease, there is an apparent increase in the number of disease states," said EPA assistant administrator Stephen Gage. Before deciding whether to recommend permanent relocation, EPA plans more extensive studies, including sperm analysis, and a more detailed determination of the incidence of cancer and other diseases among residents. But for many Love Canalers, the future projects seem academic. The congressman from the Love Canal area, John LaFalce, said: "There's such a state of fear, they'll never want to move back."

MATT CLARK with MARY HAGER in Washington,  
DAN SHAPIRO in New York and WILLIAM MARBACH in Niagara Falls

# What to Do With Waste

**A**t a hazardous-waste site in California's Silicon Valley, benign bacteria are busily lunching on toxic chemicals. In Brandon, Fla., soil contaminated with cancer-causing PCB's is being loaded into truck-size toaster ovens and blasted by infrared heat. At infamous Love Canal, engineers are preparing to use a plasma-arc torch to destroy toxic chemicals with superheated gas. Given all these exotic waste busters, why is the United States suffering a plague of garbage?

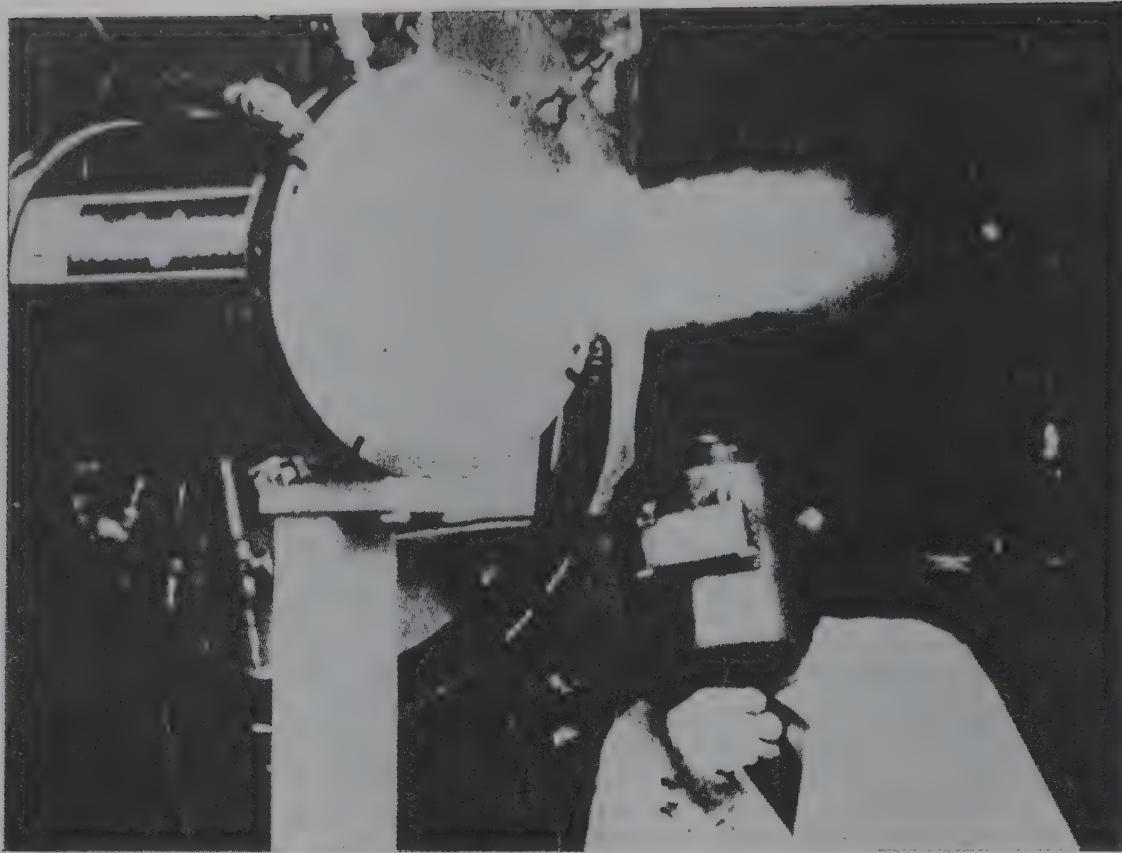
These technologies are working away at detoxifying the most hazardous waste sites, but they can't do much to decrease the sheer volume of solid waste. Garbage disposal is mostly a low-tech or a no-tech business. Each day America churns out about 400,000 tons of garbage. More than 90 percent of it is simply trucked to landfills and buried. Besides the dead refrigerators, old tires, commercial debris and household trash, there's a torrent of hazardous chemical wastes. The result: landfills like the one at Fresh Kills in New York's once sylvan borough of Staten Island. The 2,000-acre mountain of garbage towers over an expressway; it has taken on an eerie quality: thousands of seagulls swirl above it searching for edible scraps. Such scenes are not unique to New York. "Every major city in the United States has a landfill problem," says Neil Seldman, codirector of the Institute for Local Self-Reliance, a Washington-based nonprofit consulting group.

Politicians have few alternatives when the landfills overflow. They can send the trash somewhere else. Philadelphia, which closed the last of its dumps this year, has started exporting garbage to Panama. That solution doesn't always work, as Islip, N.Y., officials found when they sent their notorious garbage barge on its epic, two-month voyage in search of a dump. The officials are now trying to arrange to burn the bargeload at a Brooklyn incinerator, but residents are fighting the plan. No surprise: trash incinerators inevitably spark protests from those fearing pollution.

Nevertheless, there are more than 70 waste-to-energy plants burning garbage and producing electricity or steam as a by-product. Columbus, Ohio, for one, has a \$200 million incinerator that consumes 2,000 tons of garbage a day and generates 50,000 kilowatts of electricity an hour. Mayor Dana G. Rinehart boasts that a 30-pound bag of garbage will light two 100-watt street lights for 24 hours. But environmentalists warn that incinerating plastics and other garbage releases toxic chemicals, including dioxins, into the air. "You can just think of an incinerator as a dioxin factory," says Barry Commoner, environmentalist and director of the Center for the Biology of Natural Systems at Queens College in New York. The incinerators also produce tons of ash often contaminated with lead



'Every major city has a problem': California landfill



COURTESY WESTINGHOUSE

**Garbage buster:** The plasma-arc torch destroys toxic chemicals with hot gas

and cadmium. One way to reduce pollution is to cull the garbage first. Richard Denison, a scientist with the Environmental Defense Fund in New York, says: "There are clearly a number of materials that should not be burned, such as batteries."

**Milk jugs:** Most Americans are not in the habit of sorting garbage. "Recycling requires more of a social effort than a technical one," says Allen Hershkowitz, director of solid-waste research at INFORM, a New York environmental group. New Jersey, Oregon and Rhode Island have mandatory recycling. Plastic milk jugs, for instance, are melted down into boat docks and garden furniture. But even if more states get tough on garbage, recycling alone won't solve the crisis. The Japanese recover up to 65 percent of their trash but still have to burn or bury the rest.

Getting rid of toxic industrial wastes is even more complicated than disposing of everyday garbage. Engineers have come to the rescue, however, creating a variety of advanced technologies; many are mobile units that can be trucked to a toxic-waste site. In plasma-arc furnaces like the one being readied at Love Canal, the 10,000-degree-Celsius blast of hot gases breaks the toxic molecules down into safer compounds without producing byproducts like dioxins. Another process uses infrared heat to turn contaminated sludge into an inert, glassy substance encapsulating any contaminants that don't burn away.

A more exotic approach is to take advantage of naturally occurring bacteria already growing in toxic dumps. Just about every organic chemical seems to be food to

some highly specialized microorganism. In Silicon Valley, where underground storage tanks at electronics plants have leaked toxic chemicals into the ground water, the contaminants are being pumped into "bioreactors"—vats where bacteria eat the chemicals and excrete harmless byproducts like carbon dioxide and water.

Despite the development of such exotic technologies, some toxic waste is still burned, adding to public anxiety about incinerators: no one wants them in his neighborhood. But plans to ease that problem by burning toxic wastes at sea raise fears of spills from the vessels hauling the wastes to offshore incinerator ships.

**Medieval cities:** In the face of such formidable social impediments, can technology solve the crisis? Barry Commoner predicts that municipal trash incinerators will become as entangled in red tape as nuclear power plants. "The only way to deal with toxic chemicals is to stop producing waste," says Commoner. "It's really an insoluble problem." On the other hand, mankind has been along this road before: medieval cities were disease-ridden pigsties. Yet eventually science and public-health-conscious governments of the 19th century found ways to improve sanitation, thereby immeasurably enhancing public health. A similar challenge looms now. The question is whether the United States has the will to make social changes and use innovative technologies before the garbage crisis becomes intolerable.

WILLIAM D. MARBACH with SUSAN E. KATZ  
in Washington, DODY TSANTAR in New York  
and bureau reports

## ■ ENVIRONMENT

# Disused waste dumps are chemical time-bombs ticking away all over Germany

Chemicals and micro-organisms can seep from garbage tips into the ground water and be a serious environmental and health hazard. Brunswick hydrologists have examined the risk in closer detail.

Their findings convey a clearer idea of whether toxins and germs have been disposed of for good by being dumped in this way.

They also present a scientific assessment of the threat to ground water resources and its consequences for the operation of garbage tips.

Garbage is certainly a growth industry, with higher consumption leading to larger quantities of waste ranging from plastic bags to coffee grounds and from tins to spray cans.

The current annual total is 30 million tons of household refuse, 26 million tons of sewage sludge and 10 million cubic metres of effluent that cannot be recycled.

As a result, most waste is dumped on garbage tips. But how safe is it there?

Peter Spillmann of the Leichtweiss Hydrology Institute in Brunswick has published the findings of five years of research by engineers, hydrogeologists, chemists, microbiologists and agricultural scientists.

Entitled *The Water and Oxygen Cycle in Garbage Tips and Its Effect on Water Resources*, the report was financed by the Scientific Research Association (DFG) and coordinated by Professor Hans-Jürgen Collins.

Garbage tips are one of the ways in which harmful substances most readily seep into the ground water.



There are over 50,000 unchecked old garbage tips around the country where seepage is a potential contamination hazard.

The trend is toward keeping seepage in check by means of garbage compression and drainage systems to ensure that harmful substances aren't so readily channeled into the biological cycle.

The aim must be to specify and quantify local authority garbage, including all harmful substances and their compounds and derivatives.

Two thirds of the country's garbage is still dumped without prior processing or treatment, which is the softest and least expensive option.

Scientists set up a field laboratory at a municipal garbage dump in Brunswick, combining miniature tips of specified garbage and artificial ground water access.

Given identical initial conditions, project scientists gained their first clear idea of "natural behaviour" in rubbish dumps.

The garbage probed was stored in cylindrical containers six metres tall and five metres in diameter, with access from all sides, inspection valves and flexible outer walls.

Ten containers were filled with garbage of various kinds and sealed to rep-

resent various categories of rubbish dump.

Categories included compressed household garbage, household garbage and water or sewage sludge, some in soil through which air can permeate, some in between impermeable strata.

Seepage was found to occur from all garbage tips, the exact amount depending on how densely or thickly packed the garbage is and how moist the subsoil is.

Deceptively, the first seepage can take up to a year to occur and — a point of particular importance — in all categories of dump the amount of seepage definitely increases once the tip has been closed.

All seepage contains germs: in waste from doctors' surgeries, in sewage sludge or in such mundane items as disposable nappies that are dumped straight on to local authority garbage tips untreated along with other household waste.

Germs are quickly killed, but only in the middle of dumps where temperatures of over 60° C are reached due to decomposition.

So Brunswick scientists are unable to forecast when dumps will cease to be a health hazard. Germs certainly have a shorter life if garbage is allowed to decompose in the fresh air before being dumped.

In this way germ seepage can be kept to a minimum and the storage density and active life of a dump increased by up to 70 per cent.

The report says no conclusions have yet been reached on long-term effects on water resources. But household garbage and household sewage sludge are unlikely to have any harmful effect when stored at an orderly dump.

This means a dump where seepage water is largely purified and access checks to ensure that no industrial waste is dumped.

Keeping an eye on old tips is likely to

prove expensive, especially where unsuitable, harmful substances have been stored in the past.

Seepage from these tips may still be clean, but some toxins take years to appear: in some cases because they make various chemical transitions, in others because it is a while before containers rot.

So ongoing trials in Brunswick and the new DFG research programme on Harmful Substances in Ground Water will deal with the long-term repercussions of garbage tips and seepage.

Until findings are available many old tips will continue to be biological and chemical time-bombs.

*Donné Nobert Beyer  
(Nordwest Zeitung, Oldenburg, 25 March 1986)*

# The crisis of old waste dumps

By European Environmental Bureau

## NATURE AND EXTENT OF THE PROBLEM

'LOVE CANAL' in the small city of Niagara Falls has a sinister claim to fame. At the end of the 1970s the United States' authorities found in it around 20,000 tonnes of dumped chemical waste which had been at the root of many cases of cancer and child malformation. As a result, 2,500 people were forced to leave their homes and claims for compensation were filed for a total of more than \$11 billion.

In the wake of this affair the United States became aware of the need to manage their industrial past. At the end of 1985 the US Environmental Protection Agency (EPA) put at 21,512 the number of potentially dangerous dumps on the territory of the United States, of which 1,750 were in urgent need of repair.

In Europe, the warning signals were less spectacular (or perhaps received less publicity). Nevertheless, some cases did come to light, such as that of the Lekkerkerk dump in Holland, where 870 people were forced to leave their homes and where clean-up measures had to be taken at a cost of around

\$70 million: a total of 150,000 tonnes of earth had to be moved owing to the presence of around 2,000 drums containing roughly 500 tonnes of waste. As a result some Member States – but not all – decided to make a systematic inventory of contaminated dumps. These inventories, which were sometimes extended to include disused industrial sites, produced worrying results.

In Denmark, an enquiry carried out in 1980-82 among local authorities found 3,115 sites thought to contain chemical waste. 501 sites (the majority of them dumps) have actually been listed as problem sites, 114 of them forcing urgent measures to be taken to safeguard the groundwater. A budget of 400 million Danish kroner (50 million ECU) has been set aside for cleaning up the sites over the period 1983-1993. However, in 1985, the number of sites listed had risen to 1,007.

In Holland, 4,300 potentially contaminated sites were listed in 1980. Today it is thought that around 5,000 sites exist, of which at least 2,000 require closer investigation, and 1,000 immediate clean-up measures. In total almost 4.5 million cubic metres of contaminated earth would have to be 'treated'.

The cost of cleaning up the contaminated sites was estimated in 1984 at 2.5 million florins (1 billion ECU) spread over a period of 16 years. This estimate was revised sharply upwards in 1986.

According to reports drawn up by the Lander authorities, there were around 50,000 waste dumps in the FRG at the beginning of the 1970s. Research carried out up to now suggests there are around 35,000 potentially contaminated sites (including 30,000 dumps). 5,400 sites would require treatment and 10,600 further investigation. The Federal Agency for Environmental Protection (Umweltbundesamt) recently estimated that the total expenditure needed to assess the risks and clean up old waste dumps already identified would be DM 7.6 billion (3.5 billion ECU), whilst expenditure on disused industrial sites would run to DM 9.2 billion (4.2 billion ECU).

In France an initial survey of old dumps containing dangerous waste carried out in 1978 identified 450 cases, of which 80 called for immediate action. Since then a further 60 serious cases have been identified.

In England the Ministry of the Environment put at more than 10,000 hectares the area of soil contaminated (soil which, as a result of previous use, contains substances which pose a danger to planned future use).

In Belgium 8,363 waste dumps — including 148 sites containing chemical and/or infective waste — had been identified in 1982 in the Walloon part of the country alone.

The problem of old waste dumps appears particularly daunting from another point of view: industrial activity over the last 25 years has seen the pro-

duction in the EEC of at least 300 million tonnes of dangerous waste, the majority of which has 'naturally' been dumped without special precautions.

## GOVERNMENT RESPONSES TO THE PROBLEM

In the United States the problem of old waste dumps is at the heart of special legislation passed in 1980: the law on liability, compensation and urgent measures (CERCLA). This legislation lays down in particular an objective liability to a maximum of \$50 million for damage caused to natural resources in the public domain by the dumping of waste. In addition, a guarantee fund for the combating of dangerous substances (Superfund) has been set up with an initial grant of \$1.6 billion to cover the next 5 years. This fund, which is designed to cover cases where no culprit has been identified or where that culprit cannot, or refuses to, clean up a site, draws around 86% of its resources from a tax on chemical and petroleum products. The level of the tax to be levied on crude oil has been set at 0.79 cents per barrel; the levels of the taxes planned for other products vary between 0.22 cents per tonne (potassium hydroxide) and \$4.87 per tonne (aromatic hydrocarbons). The average tax per tonne on the whole range of products is \$3.39.

In the European Community only a few Member States have adopted a specific policy with regard to the problems of old waste dumps or contaminated sites in general. This report will concentrate on three countries: Denmark, Holland and Germany.

In 1983 Denmark passed specific legislation on sites contaminated by chemical waste. This legislation requires regional and local authorities to carry

out inventories of sites. The budget allocations (for the period 1983-1993) and the division of responsibility have been organized as follows:

- for central authorities 21 million (clean-up measures) ECU
- for regional authorities 18.75 million (research) ECU
- for local authorities 11.25 million (implementation and monitoring of control measures) ECU

In addition, over the period 1986-1989 the Danish Ministry of the Environment plans to spend 2.5 million ECU on research and development projects covering the contaminated sites, and 1 million ECU on a pilot clean-up project. It should be noted that the regional authorities are empowered to reclaim the cost of cleaning up a site from the firms responsible (even for acts committed prior to the 1976 law on chemical waste).

In 1980 Holland adopted highly systematic criteria for identifying and classifying contaminated sites. Recommendations on banned and restricted substances in soils were even drawn up (and are at present under review). A law introducing interim measures on soil pollution was adopted on 29 December 1982. This law provides for the financing of clean-up operations on polluted sites on the basis of a concept of shared liability between central government, the provinces, municipal authorities and some industries. In this connection the law makes it possible to tax sales of chemical products and mineral oils.

In any event, the authorities have the power to reclaim the cost of cleaning up sites from the industries responsible, on the basis of the polluter pays principle and the concept of negli-

gence (30 suits before the courts and 150 in preparation).

In Germany the Lander authorities bear responsibility for identifying and dealing with contaminated sites. The policies pursued differ in detail but are all based on Federal Legislation passed in 1972 which made it compulsory to provide information on old waste dumps. This legislation was strengthened in 1984 by the creation of a working party (LAGA) which was given the task of registering and assessing all abandoned sites, including disused industrial sites.

Until now the measures taken have principally been financed by the regional authorities. By way of an example the Minister of the Environment in North Rhine-Westphalia set aside a budget of DM 40 million (18 million ECU) in order to contribute 50% to the cost of investigating and treating sites. A fund (the Ruhr Land Fund) has also been set up to buy abandoned sites in order to reclaim and resell them, with a budget of DM 500 million (227 million ECU) spread over 10 years.

At Federal level DM 80 million (30 million ECU) was added to the budget for the period 1984-1988 in order to develop and apply new techniques for treating contaminated soils.

There are cases where the industry involved has itself taken responsibility for the reclamation of a site. However, serious problems have emerged regarding the application of the polluter pays principle, such as the bankruptcy of the firm responsible. As a result the Confederation of German Industry has proposed a special fund of DM 100 million (45 million ECU) to aid local authorities in the assessment of the risks associated with abandoned waste dumps. Some Federal and regional

authorities now plan to set up a fund whose resources will come from a tax levied on certain chemical products, or from a tax levied on special types of waste on the basis of their volume and toxicity.

At international level the question of old waste dumps has occupied the attention of the OECD since 1980 and led to that organization holding a seminar. The various aspects of the policy to be pursued with regard to illegal dumps are still being considered by the Group on Waste Management Policies.

In addition, between 1981 and 1984 the NATO Committee on the Challenges of Modern Society carried out a pilot study into the management of contaminated soils. The United States has also proposed that its work should be extended to cover technologies used in cleaning up such sites.

## COMMUNITY PERSPECTIVES

### Present situation

The European Community first tackled the problem of old waste dumps in 1978. Article 7 of Directive 78/319/EEC of 20 March 1978 on toxic and dangerous waste stipulates: 'Member States shall take the necessary steps to ensure that such toxic and dangerous waste is recorded and identified in respect of each site where it is or has been deposited.' Almost 9 years after the adoption of this directive all the Member States should possess an inventory of old waste dumps and be able to make it available to the Commission (or risk being brought before the courts for default).

In 1984, in reply to a parliamentary question, the Commission stated that it did not plan to take any specific measures regarding old waste dumps.

Nevertheless, in 1986 it initiated a wide-ranging study of the legal and technical aspects of the problem. And its proposal for a fourth environmental action programme states: 'The question of the clean-up of sites where uncontrolled discharge of wastes has taken place in the past will be examined, as well as the possible intervention of Community funds, e.g. the Regional Development Fund'.

In fact, as time has gone on, the problem of old waste dumps has become extremely serious, important, complicated and expensive. The need for Community action was highlighted by the round table on the safety of dangerous wastes organized in Dublin by the European Foundation for the Improvement of Living and Working Conditions on 27-29 November 1985. The conclusions of the meeting include the following: the European Community should adopt a policy of identification, evaluation and treatment of contaminated sites. This is a problem of interest to the Community as a whole:

- because it exists in all Member States;
- because the extent of the problem requires international cooperation in the search for solutions;
- because some Member States may not have the financial and technical capabilities needed to deal with it;
- because it involves one factor in economic competition (increased costs in those countries adopting a policy of cleaning up sites).

### Aspects of the problem

- The policy for the Management of old waste dumps (and disused industrial sites) involves consideration of the criteria for the identification of sites, the evaluation of risks and the selection of possible corrective measures.

All these criteria would benefit from being made more objective through harmonization at Community level.

- As regards technical know-how, the discovery of 'new' methods of treating sites must have priority, together with the transfer of knowledge acquired in some Member States to the authorities (national, regional and local) in others.

The European Community should thus contribute to research and development in this field and, more particularly, assist certain countries (e.g. through ERDF resources).

- The basic problem remains of mobilizing the necessary financial resources. The basis of the polluter pays principle is that if the parties legally responsible for the creation of an illegal waste dump are known and solvent, these parties are required to carry out the necessary reclamation. However, this principle does not resolve:

1. the problems of establishing civil liability;

2. cases where there is no solvent or identifiable responsible party;

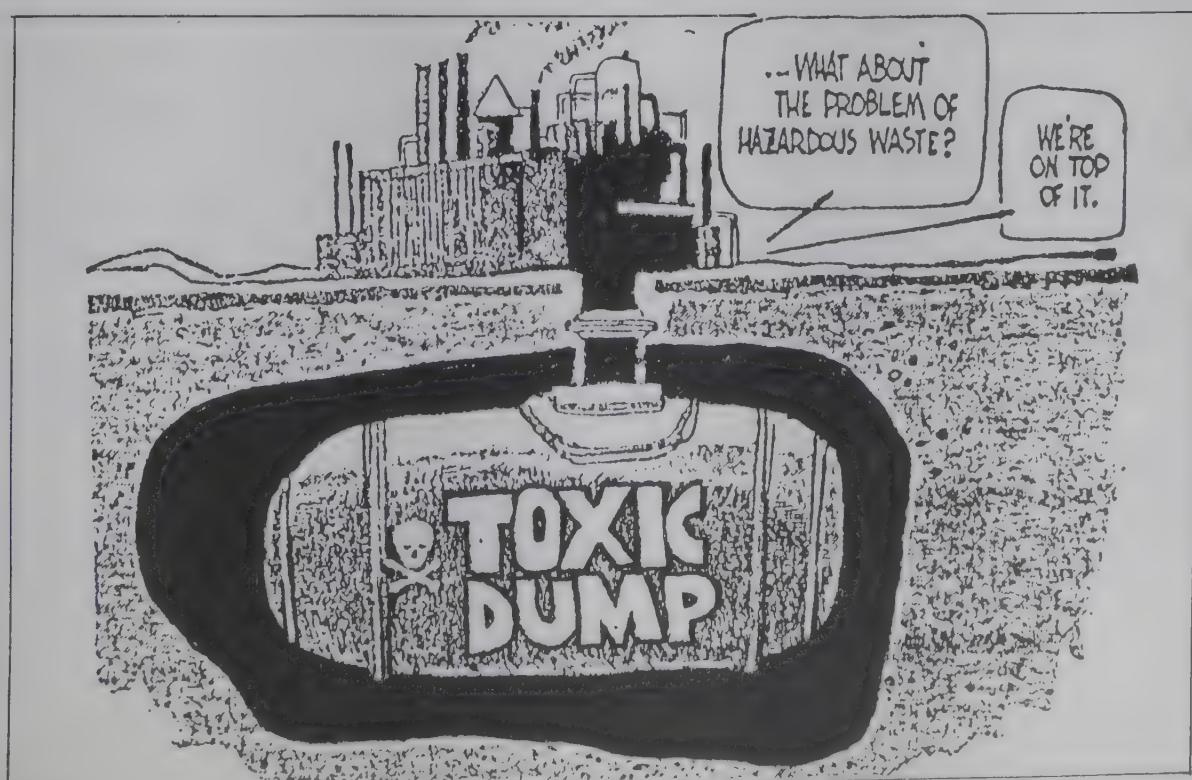
3. the need to finance research and development and the monitoring of sites.

- Above and beyond the need to manage of our industrial past, the problem of old waste dumps leads one to ask questions about the future: how far and under what conditions is it reasonable to continue to allow the dumping of dangerous waste?

In this respect it is significant that in the United States a regulation banning the dumping of waste is to come into force on 1 January 1987. Under the terms of this regulation, no batch of dangerous waste can be disposed of in a dump without special authorization obtained by the producer and the firm operating of the dump. This special authorization is only granted if the producer can show proof that no other solution is technologically or economically feasible.

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This chapter is taken from 'Soil Contamination Through Industrial Toxic Dumps', a report by the Belgium-based European Environmental Bureau.



# Nuclear dump provokes protest in Japan

By Jonathan Holliman

JAPAN'S 30 nuclear power plants have been described as 'condominiums without sewerage facilities'; they have no long-term way to get rid of the nuclear waste they generate. The government's latest attempt to solve the problem, by creating a storage site in a remote northern corner of Hokkaido, is provoking a vigorous local protest.

There are now 300,000 drums of low-level radioactive waste in temporary storage at nuclear plants around the country, a cache of 'sewerage' that grows every year. A plan to dump it into the Pacific Ocean aroused such ire among Pacific island nations that the London Dumping Convention in September 1985 decided to suspend indefinitely all nuclear dumping at sea.

In addition, high-level waste, the end product of spent fuel from Japan's nuclear plants, is currently stored in Britain and France, where it is reprocessed. This lethal stockpile is growing at a rate of 700 tons a year, and under the reprocessing contracts it all must be returned to Japan eventually. Finding a place to keep it has become crucial to maintaining and expanding Japan's nuclear power industry.

The latest answer is Horonobe, a town of 3,700 people set in a dairy-farming and fishing district in the far north of Hokkaido. In 1984 the Power Reactor and Nuclear Fuel Development Corporation (Donen) announced that a permanent centre for research and for the storage of high-level waste would be built at Horonobe, to be operational in 1992.

Initially, the local population split on the issue. The Horonobe town council and the local agricultural co-operative supported the Donen plan as a way to bring in government funds and revitalise an area which has been losing population rapidly to the southern islands. But opposition rallies in 1984 and 1985 attracted several thousand protestors and around 300 dairy-farmers formed a group under Kawakami Yukio to block the plan.

'We cannot allow our area to become a nuclear dump after all our years of hard work to make the soil productive,' Kawakami told a rally.

The Governor of the Hokkaido prefecture, who is allied to the Japan Socialist Party, rejected Donen's pro-

posal to begin a feasibility study. The Liberal-Democratic Party majority in the prefectural assembly countered by passing a resolution calling for an early start to the study. Since a high-level waste dump has never been built in Japan before, the Governor's power to block its construction is a matter of legal debate.

Donen, however, went ahead and undertook a surprise preparatory site inspection in Horonobe at the end of 1985 without giving notice to the Governor or any of the local government leaders and residents opposed to the plan. The inspection was to decide points for rock boring and seismic surveys and was taken without notice to avoid possible 'confusion among the residents', according to a spokesman for Donen.

More than 2,000 angry opponents occupied the site immediately after the inspection and several organisations made known their intention to use force to prevent the feasibility study.

'We will never forgive Donen for the sneaky way they resumed the survey,' said Nobura Morio, who heads the council of Hokkaido workers' unions. While opponents kept watch throughout the winter for any further forays into the site, a civic group conducted a survey in the 10 major cities of Hokkaido. Ninety percent of those who responded were opposed to the dump. Another survey by farmers' groups found that 85% of Hokkaido's urban dwellers would reject dairy products from Horonobe if the dump was sited there.

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Jonathan Holliman is Information Officer with the United Nations University, and also a member of Friends of the Earth, Japan.

When Donen teams entered the site again in August 1986, demonstrations erupted which had to be dispersed by riot police. Meanwhile the scientists continued to argue over whether such a dump could ever be made safe. Horonobe is a risky site because of its soft soil and earthquakes, argued Takao Oka, a researcher at a government research institute in Hokkaido.

According to Oka, boring points in the ground for the geological survey are near several underground faults which may be active. A fault can be found only 1.5-2 km east of the drilling-survey site, as well as others further east of the fault.

Moreover, at least two earthquakes in the past had their seismic centres traced to these underground faults, Oka said. Along the faults, the researcher has also found a gas layer in the earth at a depth of 1,000 metres. The ground in the area is flimsy, comprising mostly sand and pebbles and retains water, a layer of which goes 1,000 metres deep, he said.

The nuclear fuel corporation plans to build an underground experiment facility as part of a storage centre to a depth of several hundred metres underground.

Donen said that it had considered past reports of earthquakes in the area during its planning. With earthquake-prevention devices, there should be no ill-effects on the facility, Donen claimed.



**Part III**

# **WHAT IS TOXIC WASTE**

# What is hazardous waste

By Consumers' Association of Penang

'HAZARDOUS WASTE' can be defined as waste which if disposed off into landfills, air or water in an untreated form, will be detrimental to human health or the environment. Such waste would include toxic organics, toxic inorganics, non-biodegradable and bioaccumulative materials, flammables, explosives and potentially explosive materials, corrosives, and teratogenic, carcinogenic or mutagenic materials. This is how the Australian Environment Council has defined 'hazardous waste'.

Chemicals are said to have a mutagenic effect if they cause alterations in genes which are transmitted from generation to generation, i.e., if they cause heritable genetic damage. Chemicals are said to be carcinogenic if an exposed population exhibits 'abnormally' higher incidences of cancer than an unexposed population. Many chemicals cause cancer because they are mutagenic, producing mutations in cells other than those which are transmitted from generation to generation. Thus, most mutagens are carcinogens and vice

versa. Chemicals which are teratogenic cause damage to the developing foetus in the mother's womb, e.g. by inhibiting normal development of particular organs or limbs.

Obviously, some guidelines need to be developed in order to ascertain what chemicals are toxic or hazardous. Characteristics of toxic chemicals or hazardous substances are based on measurable traits for which standardized tests are available in the US. They are as follows:

- ignitability — posing a fire hazard during routine management.
- corrosivity — ability to corrode standard containers or to dissolve toxic components of other substances.
- reactivity — tendency to explode under normal management conditions, to react violently when mixed with water, or to generate toxic gases.
- toxicity — presence of certain toxic materials at levels greater than those specified by regulations.

# HOW TOXIC WASTES POISON US

TOXIC wastes are one of the major environmental hazards in the world today. They pollute our environment, food and water.

In Malaysia, 377,000 cubic metres of toxic wastes were produced in 1987 and in Europe, 20 to 30 million tons of toxic wastes are produced yearly.

Toxic wastes can pollute our soil and water in the following ways:

## ● DUMPS

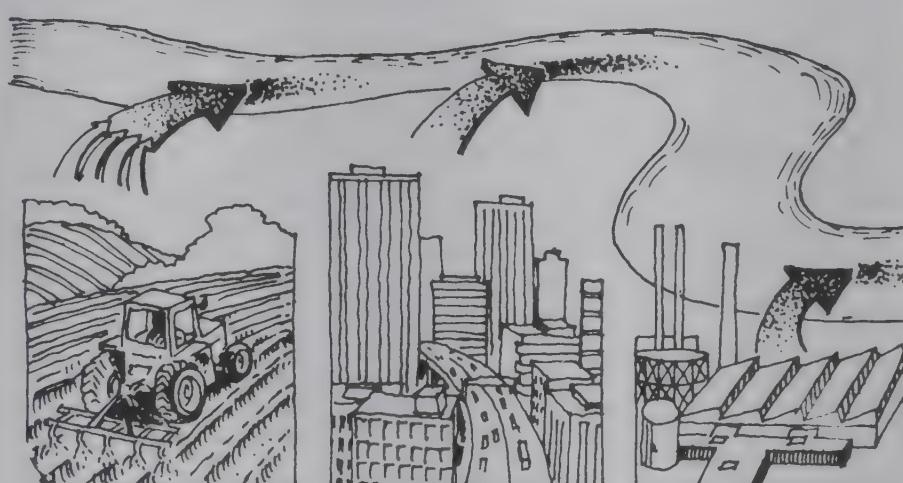
Toxic wastes are dumped in various ways. Industrial and household toxic wastes (which include plastics, batteries, paint remnants and medicines) may seep into the groundwater underneath the waste dump. The groundwater travels and may get into our drinking water supplies.

## ● LEAKAGE INTO SOIL

Storage of toxic wastes on and in soil may contribute to pollution of our soil and water. Underground tanks which are used to store toxic wastes may leak over time and drains may break.

## ● WASTE USED TO RECLAIM OR FILL AREA

Toxic wastes are sometimes used to refill or reclaim land, as in the land reclamation area in Jelutong, Penang. Such reclaimed areas are dangerous as the toxic wastes may pollute our underground waters or even worse, they may escape from the ground into the air.



### Agricultural run-off

Pesticides and herbicides that are not bio-degradable poison us and pollute our environment for a long time. Nitrates from fertilizers can poison our drinking waters and cause cancer.

### Urban centres

Municipal drainage systems pour out domestic and industrial sewage, contaminated with toxic chemicals, heavy metals, oil, and organic nutrients.

### Industry

Much of the complex mix that goes into industrial waste ends up in the sea. Included are partially bio-degradable food wastes, heavy metals, and persistent pesticides.

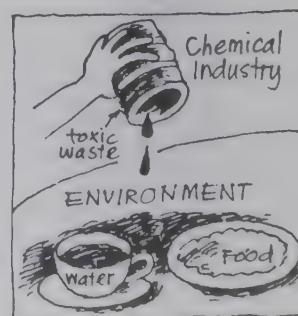
— Adapted from "The Gaia Atlas of Planet Management", edited by Norman Myers

## ● RAIN

Many industries emit their waste into the air. The polluted air is washed down by the rain to pollute our soil and water. Besides industrial air pollution, exhaust gases from vehicles (containing lead and polycyclic aromatic hydrocarbons) and insecticides also pollute our soils and waters.

## ● POLLUTION FROM RIVERS AND SEAS

Drainage of all kinds of toxic wastes into our drains and rivers can also poison our soils and water system. Water and mud become contaminated with heavy metals, polycyclic aromatics, oil and other chemicals.



# SURROUNDED

WE live today in a chemically-charged environment. We are poisoned by thousands of synthetic chemicals in our industries, products, pesticides, foods and water.

In 1980 alone, 70,000 different synthetic chemicals were produced and used. And in the USA alone, about 80 billion kg of chemicals were introduced into the environment.

Many of these chemicals are toxic and their insidious spread is difficult to detect in the short term.

But one of the long term effects can be seen in the increase of cancer cases in recent times. In the United States one in three persons will get cancer. And the figures are rising by 2% a year.

Some of the toxic chemicals used today are deadlier than anything we have had to face before.

DDT, dieldrin and other

pesticides are suspected of causing cancer and birth defects, among other problems.

Polychlorinated biphenyls (PCBs) used in plastics, electrical equipment, cosmetics, soaps and other common products are unusually toxic and persistent. They affect our vital organs and the reproductive systems of animals.

Heavy metals such as mercury, lead, cadmium, chromium, and nickel, are believed to cause cancer, and disorder of the lungs, heart, kidneys and the central nervous system.

Yet we generate vast amounts of these poisons.

In Malaysia, some 650 industries produce 380,000 cubic metres of toxic wastes per year, of which 200,000 cubic metres of solids would be produced if they were treated. 615,000 empty containers of the toxic wastes were also disposed yearly.

Certain pollutants, especially pesticides and PCBs, accumulate in the fats of man, animals and organisms.

And they become concentrated in man and animals as they pass up the food chain — from microscopic planktons, to plants, and finally to animals and humans.

As a result, their eventual concentration can increase a million times when they reach humans.

High levels of DDT, PCBs and other chemicals are today detected in the breast milk of mothers.

Pesticides like DDT is now everywhere — it was even found in the fat of penguins in the Antarctica.

The toxic chemicals pumped into the air, dumped in rivers and seas, or hidden from view in toxic dumps do not simply melt away. Our environment is a closed system and these chemicals will surround and poison us.

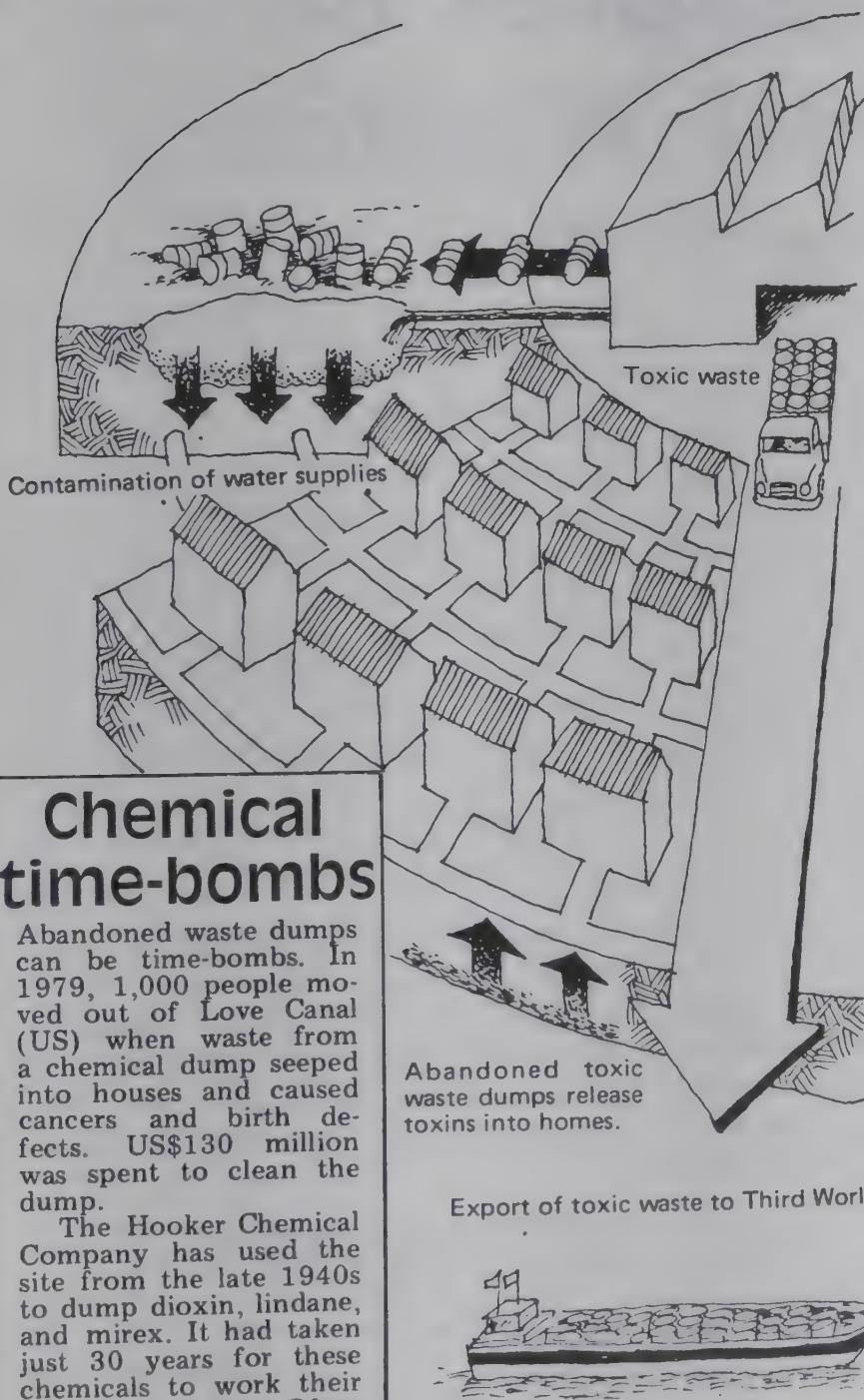
## The fight against toxic wastes in M'sia



Photo of plastic bags, alleged by residents to contain radioactive waste, in the factory compound and its vicinity. (Photo taken on 17.3.85.)

BUKIT MERAH symbolises the fight against toxic waste in Malaysia. Eight residents have taken a court case to close down Asian Rare Earth, a company that concentrates radioactive waste which scientists say is linked to serious health ailments, including cancer. At present the waste is stored within the factory site, awaiting transfer to a new dumpsite.

# BY POISONS



## Chemical time-bombs

Abandoned waste dumps can be time-bombs. In 1979, 1,000 people moved out of Love Canal (US) when waste from a chemical dump seeped into houses and caused cancers and birth defects. US\$130 million was spent to clean the dump.

The Hooker Chemical Company has used the site from the late 1940s to dump dioxin, lindane, and mirex. It had taken just 30 years for these chemicals to work their way to the surface. Often such materials contaminate underground water.

## Metallic and chemical pollutants

SINCE the 1930s, when arsenic was the only metal known to be a carcinogen, beryllium, cadmium, cobalt, chromium, iron, lead, nickel, selenium, titanium, and zinc have been added to the list.

PCBs, which are totally synthetic and have no natural counterparts, have now been classified as carcinogens.

Cancer-forming chemicals, including PCBs, are found in the tissues of 99% of all Americans. In 1982, the National Cancer Institute disclosed that Americans have a 31% chance of contracting cancer before the age of 74, much of the sources being environmental.

## Body blows

HEAVY metal pollutants are responsible for wide-ranging damage to vital organs. Mercury and lead attack the central nervous system, nickel and beryllium damage the lungs, antimony can lead to heart disease, and cadmium causes kidney damage.

# Examples of Toxic Waste

By World Health Organisation

## DEFINITION OF THE PROBLEM

WASTE is something which the owner no longer wants at a given place and time and which has no current or perceived market value. Hazardous waste is waste that has physical, chemical or biological characteristics which require special handling and disposal procedures to avoid risk to health and/or other adverse environmental effects. Although radioactive waste and medical waste may clearly present health hazards, they are not covered here.

Statutory definitions of hazardous waste used by various countries reflect not only the nature of the environmental problem(s) they were designed to cover, but also the social, political and economic conditions of the countries concerned. This book does not attempt a formal, legal definition of hazardous waste; rather, it discusses how to approach such a definition and the criteria on which it could be based. When attempting to define hazardous waste, concern is essentially with waste that presents either:

(a) short-term acute hazards, such as acute toxicity by ingestion, inhalation, or skin absorption, cor-

rosivity or other skin or eye contact hazards or the risk of fire or explosion; or

(b) long-term environmental hazards, including chronic toxicity upon repeated exposure, carcinogenicity (which may in some cases result from acute exposure but with a long latent period), resistance to detoxification processes such as biodegradation, the potential to pollute underground or surface waters, or aesthetically objectionable properties such as offensive odours.

Waste with these properties may arise as by-products, side-products, process residues, spent reaction media, contaminated plant or equipment from manufacturing operations, and the discarding of manufactured products.

## CRITERIA FOR IDENTIFYING HAZARDOUS WASTE

Waste has the potential to be hazardous by virtue of the following:

- (a) the substances present in the waste;
- (b) the concentration or chemical reactivity of such substances;

- (c) the physical form in which the substances are present;
- (d) the quantity and rate of generation of potentially hazardous material;
- (e) the mobility and persistence of the potentially hazardous materials in the environment in which they are placed;
- (f) the targets available in that environment and their vulnerability to the potentially hazardous materials; and
- (g) the possibility of remedial measures and their cost.

The short-term acute and longer-term environmentally hazardous properties of a waste are a function of the chemical species present. In some cases, wastes have well defined dangerous properties and are unequivocally hazardous; such wastes generally result from the use of commonly encountered chemical compounds. The majority of wastes considered, however, are likely to be complex mixtures that do not readily lend themselves to chemical characterization.

Within the context of waste management, the hazard characteristics of a waste are more relevant than a knowledge of its precise chemical composition, which in many cases it will be impractical to obtain. The relevant hazard characteristics mentioned above can be quantitatively defined by means of certain criteria.

### Composition

The individual components of a waste should be known before a complete assessment of its hazard potential is made. This knowledge, however, is often very difficult (or even impossible in practical terms) to obtain, particularly for solid waste. To demand, either directly or by implication, that all waste be analysed for all potentially

hazardous species is quite impractical. Nevertheless, good information on waste composition is needed, and in many cases broad compositional data will be adequate. In the case of waste cyanide heat treatment salt, for example, the presence of up to 5% sodium cyanide is sufficient to dictate appropriate handling and disposal conditions. The composition of the balance, i.e. the relative proportions of sodium or potassium nitrites, nitrates, chlorides or carbonates, or barium chloride, is a secondary consideration.

### Physical Form

The physical nature of the waste (solid, semi-solid, sludge, liquid) is relevant to a consideration of both potential acute or longer-term environmental hazards. In general, liquid or sludge waste is more liable to cause water pollution problems than is solid waste. Where an inhalation hazard exists, as with asbestos, fibrous waste is inherently more dangerous than is matrix-bonded waste such as asbestos cement. Small particles of a material may be hazardous although larger pieces are non-hazardous; many finely divided metals are acutely hazardous while the massive material is harmless. Solids formed by cooling from the molten state may often be potentially much less hazardous; metal slags, for example, may be considered non-hazardous despite their often relatively high concentrations of toxic metals.

### Quantity

The quantity of the waste and its recurrent rate of generation are important. The handling and disposal of a few hundred kilograms of a particular waste as an isolated case may demand a totally different solution to the disposal of similar material generated re-

gularly in quantities that may be orders of magnitude greater (or smaller). Some countries have introduced requirements that a waste must be present at more than a predetermined minimum quantity before it is considered hazardous. This approach is administratively convenient in that it reduces the amount of paperwork associated with the regulatory process, but has certain dangers:

- the “threshold” level at which this quantity is set should not be the same for all materials unless it is set so low as to be largely useless in reducing paperwork;
- much hazardous waste is generated in small individual batches, and there is a risk that control over these arisings will be lost;
- the total quantity resulting from many small, deregulated arisings may be quite large.

The potential for environmental damage at a waste disposal site is clearly related not only to the concentration of the substance released but also to the total quantity released at a given time.

#### Acute Hazard

The acute hazard posed by the waste may be expressed in terms of oral, inhalation or dermal toxicity, flash-point, explosivity, concentration of known corrosive species, etc. Physical characteristics, such as vapour pressure and boiling-point, may be important. To avoid dangerous interactions with co-deposited materials, highly reactive materials such as powerful oxidants should also be considered. However, unless toxicity tests are performed on the waste itself, acute hazards posed

by the waste can only be predicted by the hazards posed by its components.

#### Long-term Hazard

Finally, the long-term hazard posed by the waste will depend on the chosen disposal route. For example, such properties as volatility and solubility in water and organic chemicals will influence the mobility of waste deposited in landfill. The persistence of a particular material will depend on its vulnerability to various natural breakdown mechanisms — microbiological, photochemical, oxidation/reduction, etc. The toxicity of a deposited material and its metabolites, and organoleptic factors such as taste and smell, are all relevant.

#### WELL-DEFINED, REGULAR ARISINGS OF HAZARDOUS WASTE IN THE CHEMICAL INDUSTRY

THE CHEMICAL industry uses a very large number of raw materials and processes to manufacture an extremely broad range of products — currently about 20,000 — 30,000 chemicals are manufactured in quantities greater than 1 tonne per annum. Only an outline of the industry can be given here; it will be represented as two main manufacturing sectors; organic chemicals and inorganic chemicals. While this approach is a gross over-simplification, it illustrates the complexity of the industry and the wide range of hazardous waste generated.

#### Organic Chemicals

The organic chemicals may be said to comprise:

- the production of primary organic chemicals from oil, natural gas and coal in large-scale continuous-process plants;

- the conversion of the primary chemicals into secondary or intermediate materials, which may then go for further in-house processing, for sale to downstream chemical processors, or to outlets in many industrial applications; and
- downstream processing of the intermediate materials into final products such as dye stuffs, cosmetics, toiletries, pharmaceuticals, fine chemicals, pesticides, plastics, resins, synthetic fibres, elastomers and synthetic detergents.

Waste from the manufacture of primary and intermediate organic chemicals include residues from the manufacture of organic chemicals and their processing into end products, in the form of liquids, sludges and solids. The substances present may be soluble, insoluble toxic, inert, corrosive flammable or chemically reactive, some may contain known or suspected human carcinogens.

Some examples are:

- Waste from the manufacture of primary and intermediate organic chemicals, e.g. residues such as caprolactam and sodium hydroxide from caprolactam manufacture, acid tar containing sulfuric acid and organic compounds from the purification of coal chemicals, tarry waste from the production of certain organic intermediates, and waste from the manufacture of certain chlorinated aromatic compounds.
- Residues from the manufacture of primary pharmaceutical compounds. Examples are mixed waste solvent containing acetone, butyl acetate, methanol and benzene from separa-

tion processes, waste from bulk fermentation reaction, aqueous waste from paracetamol production and mixed waste solvents containing substances such as chloroform and chlorobenzene from extraction processes.

- Selected residues from the downstream processing of organic chemicals such as solid distillation residue containing diphenylamine, aromatic amines and other substances from dye-stuffs manufacture, aqueous waste from the manufacture of biocides, filter-press cake from chemicals manufacture and liquid tar containing soluble and insoluble tars from hydroquinone processing.

### Inorganic Chemicals

Nine out of the 10 major products of the chemical industry are inorganic, including traditional products as sulfuric, phosphoric and nitric acids, lime, ammonia, chlorine and sodium hydroxide.

In the production of phosphoric acid of gypsum and hydrogen fluoride which give rise to environmental problems are formed as by products. Phosphogypsum waste may contain slightly elevated levels of radioactivity from naturally occurring uranium in the rock.

Titanium dioxide, widely used in paints, paper, rubber and plastics, is produced by the chloride process and the sulfate process. The chloride process generates large quantities of iron salts as waste. The sulfate process also produces considerable waste.

Other residues from the inorganic chemicals industry include sludge from

the Vetrocoker carbon dioxide removal process, aqueous waste from catalyst recovery by a hydrometallurgical route, effluent treatment plant sludge from glass etching lines and waste from the manufacture of photographic fluid film developer.

### DISPERSED WASTE OF INDUSTRIAL USERS

In addition to their use as raw materials for further chemical processing, the products of the chemical industry have several industrial applications. These products may be used directly as chemicals where a useful property is exploited as part of a manufacturing process (such as the use of ferric chloride and cuprous chloride, and ammonium and sodium persulfate solutions to etch the copper surface of printed circuit boards) and as ingredients in formulated products (for example, both inorganic and organic chemicals are included in asbestos-based friction materials).

### Waste from Selected Industrial Uses of Organic Solvents

The solvent power of both halogenated and non-halogenated organic solvents is widely used in industry. In the engineering industry, metal components are degreased using mainly trichloroethylene or 1,1,1-trichloroethane, either by cold or hot dipping in a solvent bath or by contact with solvent vapour. Whichever method is employed, a sump residue containing cutting oils, lubricants, fine metal particles, general dirt; etc. accumulates with use. This residue is either allowed to accumulate until an unacceptable level of contamination is reached, and

the dirty solvent then removed for disposal or recovery, or the residue is continuously removed by recycling through an on-line purification plant.

A related activity is the use of organic hydrocarbon solvents such as white spirit or kerosene, for degreasing and cleaning transport fleets. Spent hydrocarbon solvents, often badly contaminated with oil, grease and dirt and containing phenolic compounds used as industrial degreasants are typical wastes from premises where large numbers of vehicles or aircraft are maintained.

In large factory-type dry-cleaning installations, the solvent is continuously filtered and redistilled, but in small launderettes filtration without distillation is commonplace. In the latter case, the solvent is usually replaced, the dirty solvent being recovered externally by distillation to leave a disposal residue consisting of a dry, crumbly solid or an oily liquid.

In the manufacture of paint, wastes arise either as dirty solvents from plant cleaning or as reject batches of paint. Such waste solvents typically contain a number of compounds of various heavy metals such as antimony, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, tin and zinc.

Similar solvent wash-down wastes contaminated with a range of toxic heavy metals arise from the manufacture of printing inks. The use of such products gives rise to further contaminated solvent wastes from printing machinery wash-down. The waste may contain ethanol, isopropanol, butyl acetates, and aliphatic as well as aromatic solvents.

## The use of organic solvents in various industries

Use	Organic solvent
Formulation of adhesives	Ketones, aliphatic and aromatic hydrocarbons
Formulation of cleaning materials and polishes	Aliphatic hydrocarbons
Formulation of pesticides	Aliphatic hydrocarbons
Degreasing of fatty skins in tanning	Aliphatic hydrocarbons
Extractive industries, e.g. essential oils	Alcohols and aliphatic hydrocarbons
Manufacture of food flavourings, essences and toiletries	Glycols, alcohols and glycol esters
Photographic industry	Alcohols, ketones and glycol esters
Reaction media in the pharmaceutical industry	Hydrocarbons, alcohols, esters, halogenated solvents and others

### Waste from Selected Industrial Uses of Inorganic Acids

The four major inorganic acids — sulfuric, phosphoric, nitric and hydrochloric — are produced in very large quantities worldwide. Production figures for the United States in 1979 (in millions of tonnes) were: sulfuric acid, 38, phosphoric acid, 9.2; nitric acid, 7.8; and hydrochloric acid, 2.7. Sulfuric acid is the largest single product of the chemical industry, with world production in 1979 well in excess of 100 million tonnes.

By far the greatest volumes of acid waste arise from metallurgical operations, where various acids and mixtures of acids are used for etching, anodizing, electropolishing and other surface treatments of ferrous and non-ferrous metals.

### Wastes Arising from the Metal Finishing Industry

The metal finishing industry uses a large number of individual processes

designed for the surface treatment of metals and other materials to protect them against corrosion, to modify their properties, or for decoration.

Some of the more important metal finishing processes are cleaning and degreasing, chemical and mechanical surface treatments, electroplating, chemical and electrolytic stripping, anodizing, galvanizing, chemical or electrochemical machining and chemical, mechanical or electric polishing. These processes involve the use of a wide range of chemicals which may subsequently appear in liquid, sludge or solid waste arising from these operations.

Wastes from metal finishing also include redundant lead/tin plating solution containing lead fluoborate, tin fluoborate, fluoboric acid and gelatin, acid strip solution. Other examples include acid strip solutions, containing nitric acid, sulfuric acid, acetic acid, phosphoric acid and dissolved nickel, as well as spent non-ferrous metal pickling solution, spent chromating

solution, redundant cadmium plating solution and filter cake from metal finishing effluent pretreatment.

## OTHER WASTE ARISINGS

Asbestos is widely used in thermal or sound insulation or as a reinforcement in various rubber, plastic or cement products. The inhalation of asbestos fibres may cause asbestosis (a progressive scarring of lung tissue) or cancer of the lung or of the pleura. Fibrous asbestos waste or dust should be regarded as a hazardous waste and, prior of disposal, should be securely bagged and sealed at the point of generation.

A large range of animal, vegetable, mineral and synthetic oils is used industrially as raw material, as fuel, for lubrication, and in hydraulic, heat-transfer and dielectric applications, and oils frequently feature in waste. Additionally, maritime countries may be faced with the disposal of oil on beaches following accidental or deliberate spillage by tankers at sea. Tank washings from ships may also be a source of large quantities of oily waste for the receiving shore installations.

Waste containing mineral oils arise from industrial undertakings such as oil refineries, farms and various engineering activities. The waste may be contaminated with small quantities of oil, emulsified oils, non-emulsified oil mixtures or spent lubricating oils; and the degree and nature of the contaminants present will depend on the use from which the oil was derived.

Hazardous industrial waste also include discarded heat-treatment salts from the case hardening process containing sodium cyanide and barium, lead and nitrate salts. Sludge from storage tanks used for leaded gasoline,

containing organic and inorganic lead compounds, iron oxide scale, petroleum hydrocarbons and water constitute industrial waste. Redundant marine anti-fouling paint, containing cuprous oxide, cuprous sulfide, mercurous sulfide, polychlorinated biphenyl, carbon black, mixed hydrocarbon solvent, resins and flow additives is another example.

### Waste from the Manufacture of Primary and Intermediate Organic Chemicals

- Residues from caprolactam manufacture (caprolactam is a nylon precursor).

This is a liquid waste, with regular arisings of about 27 m<sup>3</sup> per month containing:

caprolactam	— typically 180 kg/t
caprolactam oligate	— typically 160 kg/t
sodium amino	— 50-100 kg/t
caproate	
sodium hydroxide	— 0-100 kg/t
(balance water)	

- Acid tar from the purification of coal chemicals.

Crude benzene, toluene and xylene derived from coal carbonization are purified by washing with concentrated sulfuric acid. The resultant liquid, tarry waste is extremely corrosive with a very strong, unpleasant, acrid odour. It may contain up to 90% of free sulfuric acid, sulfonated aromatic hydrocarbons, sulfonated heterocyclic compounds and other organic compounds.

- Tarry waste from the production of organic intermediates containing 50% acetic anhydride, 10% diketene, and anhydride tars up to 100%.

- Waste from the manufacture of chlorinated aromatic compounds containing benzotrichloride, benzal chloride and benzyl chloride.

## Typical Residues from the Manufacture of Primary Pharmaceutical Compounds

- Mixed waste solvents from separation processes, containing acetone, butyl acetate, dimethylformamide, water, methanol, toluene, benzene and isopropanol.
- Waste from bulk fermentation reaction, comprising aqueous slurry with about 1% zinc hydroxide in suspension.
- Liquid waste, containing 70% toluene, 6% chlorophenol and 20% by-products.
- Aqueous waste from paracetamol production, containing 0.1% phenol and 0.1% *p*-aminophenol.
- Mixed waste solvents from extraction processes, containing methylene chloride, chloroform, ethylene dichloride, chlorobenzene and non-halogenated solvents.

## Selected Residues from the Downstream Processing of Organic Chemicals

- Solid distillation residue from dye-stuffs manufacture, containing diphenylamine, aromatic amines, amine decomposition products, inorganic compounds, 2-naphthol and its oxidation products, and phenol decomposition products.
- Aqueous waste from the manufacture of biocides, containing 5% sodium chloride, 2% sodium sulfate, 1% sodium nitrate, 1% glycolic acid, 50 g/m<sup>3</sup> methylchlorophenoxyacetic acid, 50 g/m<sup>3</sup> chlorobenzoic acid and 1 g/m<sup>3</sup> chlorophenols.
- Filter-press cake from chemicals manufacture, containing 4% naphthenic acid, 8% metallic naphthenates and metallic oxides.

- Liquid tar from hydroquinone processing, containing 0.1% insoluble tars and 35% soluble tars.

## Selected Residues from the Inorganic Chemicals Industry

- Sludge from the Vetrocoke carbon dioxide removal process, containing about 120 kg/t arsenic, present as a complex potassium ferriarsenite.
- Aqueous waste from catalyst recovery by a hydrometallurgical route, containing 25% sulfuric acid, 0.02% nickel, 0.01% copper, 0.01% zinc and 0.01% iron, in solution.
- Effluent treatment plant sludge from glass etching lines, containing aluminofluorides of silicon, sodium, potassium and magnesium, up to 5% of ammonia and up to 6% fluorides, pH 6-8.
- Waste from the manufacture of photographic fluid film developer, containing 75% water, 10% potassium hydroxide, potassium chloride, 5% sodium hydroxide, sodium chloride plus uracil, and various organics.

## Selected Wastes from Metal Finishing

- Redundant lead/tin plating solution, containing 8% lead fluoborate, 0.8% tin fluoborate, 4% fluoboric acid and 0.2% gelatin.
- Acid strip solution, containing 40% nitric acid, 4% sulfuric acid, 2.5% acetic acid, 2% phosphoric acid and 0.5% dissolved nickel.
- Spent non-ferrous metal pickling solution, containing 13% nitric acid, 5% hydrofluoric acid plus dissolved nickel, chromium and iron salts.
- Spent chromating solution, containing 1.5% ammonium dichromate and 1.5% potassium dichromate.

- Redundant cadmium plating solution, containing 1.5% cadmium, 0.6% sodium hydroxide and 6% sodium cyanide.
- Filter cake from metal finishing effluent pretreatment, containing 74% water, 6.9% iron, 1.3% copper, 0.2% zinc, 0.5% lead and cyanides at less than 10 g/t.

#### Miscellaneous Hazardous Industrial Waste

- Discarded heat-treatment salts from the case hardening process, containing 20-400 kg/t sodium cyanide, and barium, lead and nitrate salts.

- Sludge from storage tanks used for leaded gasoline, containing organic lead compounds (tetraethyl and tetra-methyl lead) 0.01-0.025% (as lead), inorganic lead compounds 0.05-1%, iron oxide scale, petroleum hydrocarbons and water.
- Redundant marine anti-fouling paint, containing 20.5% cuprous oxide, 20.5% cuprous sulfide, 11.8% mercurous sulfide, 6.9% polychlorinated biphenyl, 3% carbon black, 16.3% mixed hydrocarbon solvent, 20.8% resins and 0.2% flow additives.

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This chapter is excerpted from 'Management of Hazardous Waste' by the World Health Organisation, 1983 (WHO Regional European Series No. 14).

# Locating and assessing soil contamination

By European Environmental Bureau

AN INVENTORY of all possible cases of (serious) soil contamination is essential for a properly executed soil cleaning operation. Such an inventory visualizes possible waste locations all over the country. This forms the basis for a planned cleaning operation. Most of the member states of the EEC haven't carried out a thorough inventory.

An inventory of waste dumps firstly deals with the question: **Where is the poison located?** The questions: **Where does it come from?** and: **What is the extent of the danger involved?** are also important.

## WHERE IS THE POISON LOCATED?

Several ways of how soil can be contaminated will be discussed successively.

### Dumping:

Toxic waste can be dumped in various ways and cause problems. Household refuse dumps: household refuse does not only consist of organic components but also contains harmful products such as plastics, batteries, paint remnants and medicine and these may cause pollution of soil and groundwater under-

neath a waste dump.

Additionally, there are industrial toxic wastes which can be dumped, legally as well as illegally, on waste dumps. Thirdly, waste dumped on and near industrial grounds. This involves solid as well as liquid waste ending up in the subsoil via drainage wells and as a result of the 'washing' of these wells.

### Leakage into the soil:

Storage of waste *on* and, mainly *in* soil may contribute to pollution of the soil, especially on industrial grounds. Chances of an underground tank to start leaking are rather high. Also, drains may break. Leakage of underground drains is not often discovered until late and hard to repair.

### Waste used for raising and filling up:

In the past (possibly it is still happening) waste was often used to repair sites: as raising material, for example for hardening industrial sites, or filling up ditches.

### Precipitation:

Many industries emit their waste via the chimney. This results in precipitation of dangerous waste on the soil.

This kind of large-scale air pollution causes large-scale soil pollution. Industrial air pollution is not our only reason for concern. Exhaust-gases (lead, polycyclic aromatic hydrocarbons) and spraying of insecticides can also cause soil pollution.

#### **Pollution through contaminated surface water:**

Year in, year out, drainage of all kinds of dangerous waste into the sur-

face water has caused the bottom of ditches, ports, channels and rivers to become enormously polluted. Dangerous waste forms a compound with the silt and precipitates. Since numerous industries can drain into the same surface water, mud can be contaminated with heavy metals, polycyclic aromatics, oil, chloral containing hydrocarbons etc. Land, regularly flooded by a polluted river or brook (forelands) may be polluted in this way.

Branch/activity	(Chemical) waste found during soil exploration
gas works	aromatics (benzene, toluene, xylene, ethylbenzene, phenol), polycyclic aromatics (PAK's), cyanides
metallurgical/galvanizing industry	various heavy metals, cyanides, solvents as toluene, xylene, tri- and tetrachloroethylene
paint/dying industry	various heavy metals, PCB's, solvents as toluene, xylene, tri- and tetrachloroethylene
graphic industry	ditto
textile industry	ditto
wood-working industry	various heavy metals, (chloral) phenols, cyclic aromatics
insecticide industry	halogenized hydrocarbons, phenols, mercury, tin, arsenic
tanneries oil-drainage/ petrol-stations	hydrocarbons, chrome
garages	hydrocarbons, lead
breaker's yards	hydrocarbons, battery acid, lead
chemical laundries	antimone, hydrocarbons, battery acid, heavy metals: cadmium, lead, zinc, antimone
stationery industry	tetra- and trichloro ethene
rubber/synthetics industry	solvents as ethanol, toluene, tri- chloroethene
shipyards and repair shops	monomer: acrylic nitril, ethene, styrene, vinyl-acetate, vinyl-chloride
photo-/film laboratories	solvents, heavy metals, halogenized hydrocarbons, phenols, mercury, tin, arsenic
laboratories	silver, various organic compounds
clay pigeon shooting grounds	various chemicals
old munition works	lead
military training grounds	heavy metals
	heavy metals

## WHICH WASTE AND WHERE DOES IT COME FROM?

In practise, numerous production processes cause soil pollution. The extent of pollution depends on which chemicals are used and the way these are dealt with. One is inclined to think of large (petro) chemical industries, however, smaller industries can also cause considerable soil pollution. A wide range of chemicals and waste is involved, especially where dumping-grounds and bottoms of water are concerned since materials of different production processes are usually involved.

As per table at foot, an overview is given of the major (chemical) wastes found in the soil, in relation to different branches and industrial activities:

## WHAT IS THE EXTENT OF THE DANGER INVOLVED?

In order to judge the seriousness of a case of soil pollution, definition of the nature and concentration of the pollutants and local pollution situation are important. The local situation (groundwater current, type of soil) largely defines to what extent contamination may spread horizontally or vertically. Judgement of wastes requires a classification of these wastes, a list indicating which waste, and if possible in what concentration, forms a threat to the quality of the soil, groundwater and consequently, in many instances, the drinking water. In developing a waste classification for soil and groundwater, it is quite obvious to link up with existing waste classification system.

Within the EEC, the Directive on groundwater (d.d. 17th December 1979, 80/168/EEC) offers a point of contact.

In this Directive, enumerations are given of dangerous waste on two lists: list I, the so called 'black-list' wastes for which hold that drainage should be prevented best as possible; and list II, the so called 'grey-list' wastes for which hold that drainage should be restricted best as possible. The lists drawn up by the EEC Directive on groundwater are no more than a starting point in achieving a waste classification for the soil, because a similar classification should apply to solid soil elements as well as to the soil containing water. The lists, drawn up to protect the groundwater, will have to be supplemented with wastes, contaminating the soil. Additionally, these lists present a rather global overview and consequently they cannot simply be used to serve as a testing framework for the cleaning of the soil; limits will have to be defined for the various wastes.

## TACKLING AN INVENTORY

An inventory must give rise to an exhaustive list of locations where activities were undertaken in the past, possibly causing soil pollution. The inventory must cover all of the country or region. A proper inventory should, in any case, pay attention to legal as well as illegal waste dumps, industrial grounds (of producing and non-producing industries) and the bottom of the water.

Data can be accumulated in various ways. Archives of local, regional and national authorities may contain valuable historic and up to date data on soil threatening activities that have taken place or are still going on. A lot of information can be drawn from permits and various maps (e.g. old topographical charts) in particular. Furthermore, there might be (or have been) tangible evidence, pointing out soil contamina-

tion, such as strange colour and smell emanating from the soil, strange objects in the ground or obscure industrial activities. Reporting similar concrete evidence or locations of old waste dumps or old industrial grounds can be stimulated by calling on (particular groups) people to report similar suspect locations collectively.

Reports can be made by neighbours, former employees of an industry that has dumped or transported pollutants or has dealt with toxic waste in an irresponsible manner, civil servants, environmental groups, etc.

From the sky, polluted locations can also be traced. A relatively large area can be searched at great heights; this way it is simple to trace illegal activities. Infra-red and regular aerial photographs may contain clues directing to dumping locations or filled-up ditches.

It is the responsibility of the government to inventory waste locations. Environmental and citizen groups can help the government on its way by mapping out a 'waste-atlas' of contaminated locations in their own region.

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This chapter is taken from 'Soil Contamination Through Industrial Toxic Dumps', a report by the Belgium-based European Environmental Bureau.

**Part IV**

**LAWS AND  
POLICIES  
TO CONTROL  
WASTE**

# Laws and policies for Third World

By Consumers' Association of Penang

CONSIDERING the experiences from abroad, Third World countries too must come to grips with the risks and problems posed by toxic chemicals and hazardous wastes. If we do not address ourselves to the serious consequences of indiscriminate dumping of deadly substances we may one day suffer the same fate as the people of Love Canal in the United States.

The absence of major disasters resulting from hazardous chemicals in our country can only be attributed to good luck rather than sound management. We cannot afford to be complacent and wait for mishaps to occur before taking action.

We urge Third World Governments to set up agencies which are vested with the responsibility of coordinating and consolidating the regulatory functions of the various government authorities regarding toxic chemicals and waste. The agencies could function along the lines of the EPA in the United States.

While existing piecemeal laws concerning industrial waste disposal must be reviewed and revamped, the first

task of the agency when it is formed should be to draft a comprehensive law that provides for toxic chemical regulation and management and proper disposal of hazardous wastes. Such a law should empower the agency to control, supervise, and regulate the relevant activities of government departments.

Let's look at what the law should cover.

## TOXIC CHEMICAL REGULATION AND MANAGEMENT

Under this law the agency concerned should

- collect basic information on all chemicals from manufacturers, processors and importers and to maintain an inventory of these chemicals. The information should include their toxicity and potential harmful effects.
- identify potentially harmful substances and require the industry to test them for adverse health and environmental effects.
- control unreasonable risks stemming from the manufacture, the processing, distribution, use and disposal of a

chemical substance.

- be notified of all new chemicals introduced into the country. Such a notice must include information concerning the composition, intended uses, proposed volume of production of the new chemical and its health and environmental effects.

Until such information is made available the agency should not approve or register the new chemical. And if the risks associated with a chemical outweigh its benefits to society, it should not be registered. In particular we should be wary of all toxic chemicals that are banned in other countries; they should not be allowed into Third World countries. For chemicals with restricted use, registration should be allowed only with relevant restrictions and conditions imposed.

## HAZARDOUS WASTE DISPOSAL AND MANAGEMENT

The agency should design a comprehensive system to monitor and control hazardous waste generation, transport and disposal. The 'cradle-to-grave' system in the United States could be adapted and introduced here. The system should have the following features.

- regulations to identify and register all hazardous wastes, the generators, transporters and disposal operators, i.e. an inventory should be maintained.
- imposition of standards applicable to generators and transporters of these wastes.
- standards for owners and operators of hazardous waste treatment, storage and disposal facilities.
- regulations requiring the issuing of

permits/licences for hazardous waste treatment, storage and disposal facilities. Such permits or licences should be for a certain period of time and renewal should require a comprehensive review of all the producers' waste management practices.

- all producers of hazardous wastes should be required to submit quarterly public reports on the types of wastes produced and the volume of wastes generated besides specifying the method of disposal, the route taken and the disposal site.

It should be the duty of the agency to constantly monitor all waste disposal sites and to make public the results of such monitoring.

A specific number of disposal sites and treatment plants should be established and all potentially hazardous wastes must be treated at the designated sites. A Site-Selection Committee should be established to oversee detailed technical, social and environmental studies on the potential disposal sites and waste treatment plants. The committee should comprise representatives of the agency, academicians, technical experts, environmental groups and members of the public. No site should be designated if it fails to meet the following criteria:

- public acceptability
- minimum site size determined by the site-selection committee
- no flood plain
- impermeable clay base
- no use for agricultural activity
- no rough terrain
- deep-well disposal without any means for surface and underground water contamination.

Annual reports on the activities of the various government agencies involved in the management of hazardous wastes should be made available upon request to all interested parties, and public participation should be included in the hazardous waste management programme.

Other requirements under the law would be

- the immediate reporting of any spill of hazardous wastes in excess of a certain amount. For dangerous wastes such as PCBs, a spill of any size must be promptly reported.
- special licences for vehicles for the transport of hazardous wastes. The vehicles should meet certain standards including provision of items such as safety valves and other special features to reduce spills in case of accident, besides portable breathing apparatus, protective clothing, radios and flash lights. There should be semi-annual inspections and defective vehicles must be banned from the road.
- no time limitation period for initiating legal action in cases of hazardous waste mishaps.

Lastly, the governments must encourage research into the development of standards for hazardous waste ma-

nagement, environmental monitoring and the regulation of hazardous waste disposal.

### Penalties

Where the laws are flouted, stringent and very deterrent penalties must be imposed. In particular, custodial sentences should be preferred to paltry fines which the industries can always afford to pay.

### Conclusion

It must be noted that the passing of a law or the setting up of a bureaucracy to implement the law alone is no guarantee that the objectives of the law will be attained. Only stringent enforcement will ensure the proper management of toxic chemicals and hazardous wastes. Third World Governments must realise their duty and moral obligation to protect the health and environment of their citizens. Considering the seriousness of the potential problems posed by toxic chemicals and hazardous wastes, the governments must act now. There is indeed much truth in the saying, prevention is better than cure, especially in relation to the management of toxic chemicals and hazardous wastes.

# Laws in industrialised countries

By Consumers' Association of Penang

## United States

UNTIL the early 1970s, disposal of hazardous wastes in the United States was typified by uncontrolled landfill disposal with industrial wastes generally being disposed off on property owned by the generator of the waste products or directly into neighbouring waterways.

Subsequent discovery of a number of disasters stemming from improper disposal of hazardous wastes led to the enactment of the Resource Conservation and Recovery Act (RCRA) in 1976.

The Environment Protection Agency (EPA) is required by the Act to issue stringent standards to owners and operators of hazardous waste management facilities. These standards are used in issuing permits for facilities to store, treat or dispose hazardous wastes. Together with the Toxic Substances Control Act (TSCA), the RCRA provides a 'cradle to grave' coverage of hazardous chemicals in general. This means that right from the time the chemical leaves its place of manufacture to the time the chemical is used and the waste disposed off, some form of

regulation and control exists. (See illustration 1)

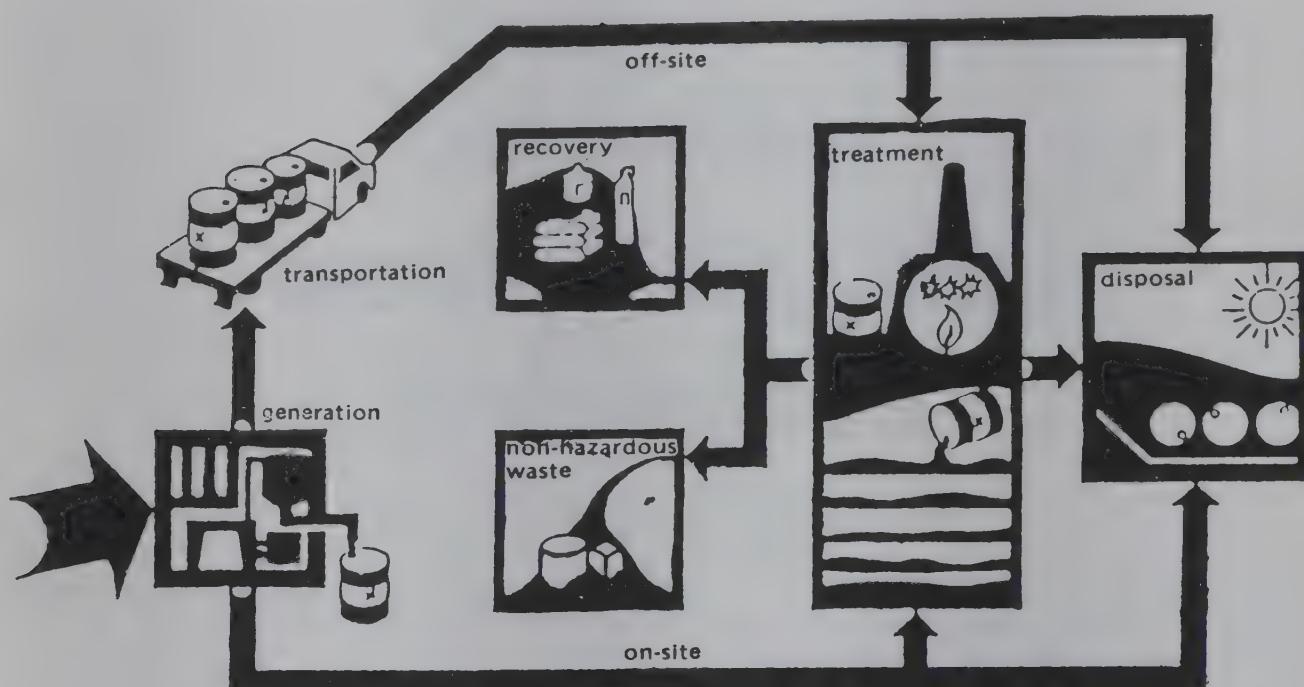
The 'cradle to grave' system incorporates the following features:

- identification and listing of hazardous wastes that are to be regulated.
- standards for generators of hazardous wastes.
- standards for transporters of hazardous wastes.
- standards for owners and operators of hazardous waste treatment, storage and disposal facilities.
- requirements for the issuance of permits for hazardous waste facilities.
- guidelines governing the authorisation of States to implement and enforce a State hazardous waste management programme.

In the United States, there are at least 18 major Federal laws directly concerned with regulating the manufacture, distribution, use, discharge and disposal of toxic and hazardous materials. Though the responsibility for the regulation of hazardous substances is split up among so many different

Illustration 1

Hazardous Waste Control - The 'Cradle-to-grave' system



Source: The Toxic Substances Dilemma - A Plan for Citizen Action, The National Wildlife Foundation; Washington D.C., U.S.

administrative departments, agencies, commission and bureaus, there are specific interagency working groups which consolidate and coordinate regulatory functions between the various agencies. Such interagency coordination and consultation is an explicit objective of the TSCA. (See illustration 2)

For example, the Act directs the EPA Administrator, in administering TSCA, to consult and coordinate with the Secretary of Health, Education, and Welfare and the heads of any other appropriate Federal agency for the purpose of achieving the maximum enforcement of the TSCA.

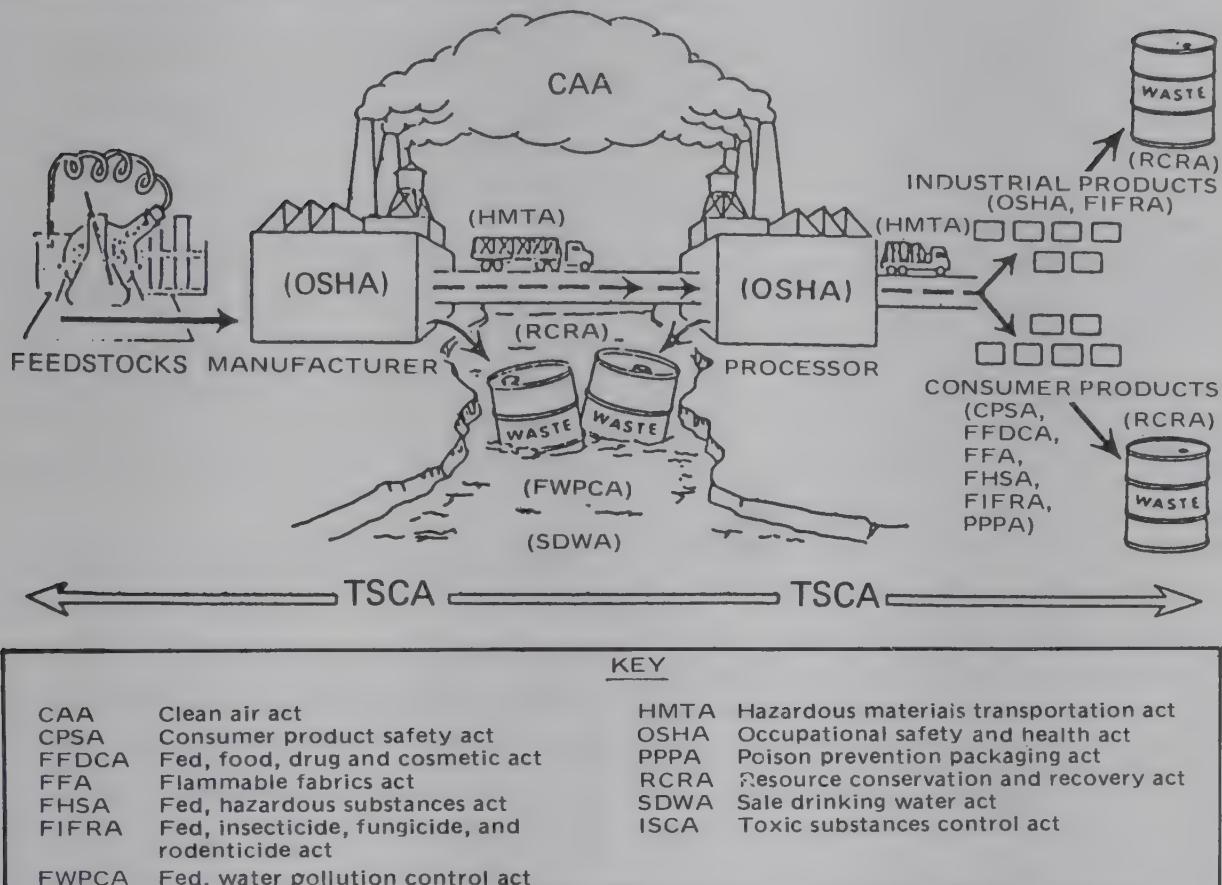
Moreover, Section 9 (a) of the Act makes affirmative use of interagency coordination in an approach that some regard as the TSCA's most important provisions. It authorizes the Administra-

tor to request other agencies to take action under other Federal laws when the Administrator reasonably concludes that (1) the manufacture, processing, distribution, use, or disposal of a chemical presents or will present an unreasonable risk of injury to human health or the environment, and (2) such risks may be sufficiently prevented or reduced by action taken by the other legal authorities.

Under the mandate of the TSCA, an Interagency Testing Committee was established in 1977. The Committee has the continuing responsibility to identify and recommend to the EPA Administrator about chemical substances and mixtures which should be tested to determine their hazards to health and the environment. It is composed of representatives of the Council on Envi-

## Illustration 2

Legislative Authorities Affecting the Life Cycle of a Chemical



Source: *The Toxic Substances Dilemma – A Plan for Citizen Action*, The National Wildlife Foundation, Washington DC, US.

ronmental Quality, Department of Commerce, National Science Foundation, National Institute of Environmental Health Sciences, National Institute of Occupational Safety and Health, non-voting observers from the Department of Defence, the Food and Drug Administration, Department of the Interior and the Consumer Product Safety Commission.

Also, under the TSCA, an Interagency Toxic Substances Data Committee was established comprising 22 Federal agencies and their components to facilitate coordination in collecting, disseminating, and classifying information on chemicals.

Similarly, an Interagency Regulatory Liaison Group has been formed to protect the public from exposure to harmful

levels of toxic substances present in land, air or water.

The basic purpose of the TSCA is to prevent unreasonable chemical risks. It gives the EPA a broad mandate to protect public health and the environment from chemical risks, to gather information on chemicals, to identify harmful substances, and to control those substances whose risks far outweigh their benefits to society.

Under the TSCA, the EPA is empowered to:

1. Collect basic information on chemical substances from manufacturers and processors, including importers.
2. Identify potentially harmful substances and require that industry test them for adverse health and environ-

mental effects.

3. Review all new chemicals for potential health and environmental risks before they are manufactured domestically for commercial purpose or imported into the US.
4. Control unreasonable risks stemming from the manufacture, processing, distribution, use and disposal of chemical substances.

One example of regulation of the chemical industry under the TSCA relates to the introduction of new chemicals where the manufacturer or importer must give the EPA 90 days notice of commercial manufacture or importation. Such notice must include information concerning the structure, uses and proposed volume of production of the new chemical. The manufacturer or importer must report on what he knows and what he can reasonably find out about the human health and environmental effects of the chemical.

It is clear that there exists in the US a comprehensive policy on the management of toxic chemicals and hazardous wastes. There is regulation of the chemical right from the time of its manufacture and use to the ultimate disposal of the hazardous wastes produced in the process.

Several other countries also have legal provisions to regulate potentially hazardous chemicals. The laws generally cover production, import, sale, use, labelling, and disposal of hazardous substances.

#### United Kingdom

The Control of Pollution Act of 1974 here allows the government to restrict production, import, sale or use of a chemical substance. The Act con-

trols the disposal of wastes on land by means of site licensing. It is an offence to dispose off *controlled wastes* in places other than on a site licensed for that purpose. Responsibility for licensing and enforcement rests with the waste disposal authorities which comprise district or county councils. The Act empowers the Secretary of State for the Environment to make special provisions for dangerous or difficult wastes and it was in exercise of this power that the Control of Pollution (Special Waste) Regulations 1980 came into force in 1981.

The objectives of the Regulations are:

- to ensure prenotification for a limited range of the most hazardous wastes.
- to keep a 'cradle-to-grave' record of each disposal of special wastes.
- to keep a record in perpetuity of the location of special waste disposal landfill sites.
- to give the Secretary of State power to direct the consignment of special wastes to a specific site.

In September 1981, the House of Lords Select Committee of Science and Technology produced a report on Hazardous Waste Disposal. Some of the relevant conclusions and recommendations are summarized here:

- Public hostility to hazardous wastes disposal facilities is common and is too important to be ignored.
- As a result of commercial pressures and a lack of national planning some disposal sites take more than their share of hazardous wastes.
- Hazardous wastes can cause, and has caused pollution, damage to health and even death.

Consequently, the House of Lords Committee recommended that all producers of hazardous wastes should be required to:

1. register with their waste disposal authority;
2. identify the person within the company responsible for hazardous waste disposal and
3. make a quarterly return of hazardous wastes produced by them, and identify the waste disposal contractor who disposed of it, the disposal route taken and the disposal site.

The Committee also made the following recommendations:

- producers of new substances are required to inform the authorities of chemicals manufactured, and the wastes produced.
- all professional handlers of hazardous wastes outside the place of production should be licensed by their waste disposal authorities. Licences should be subject to automatic revocation.
- results from monitoring of licensed disposal sites should be made publicly available.
- site operators should be required to monitor sites during, and for a set period, after the operation.
- penalties for illegal dumping should be substantially increased.
- in ensuring adequate provision of facilities, waste disposal authorities must take into consideration public opinion and the need to reassure local residents that the best means of disposal is chosen as much on environmental as on economic ground.

The House of Lords Committee

concluded that it is important for the United Kingdom to come to terms with the hazards of waste disposal and that considerable effort should be devoted to controlling and minimising the hazards.

### Japan

Japan introduced legislation urgently in the early 1970s to deal with the serious environmental problems that had arisen in the previous decade. Most notable, the Minamata, Itai-itai and Yusho Oil episodes (mercury, cadmium and PCB poisoning respectively) gave impetus for stringent control measures to be adopted.

The Waste Management Law of 1970 requires anyone undertaking the collection, transport or disposal of industrial wastes to have a permit. Generators are required to appropriately dispose off their wastes and must endeavour to reduce the amount of wastes to be disposed by regeneration or re-use of wastes. Wastes must be stored until the time of disposal in accordance with standards stipulated by the law.

If the transport, storage and disposal of wastes are not in accordance with the standards laid down, the generator or operator is required to change the method of operation, install necessary improvements or suspend use of the treatment plant.

Waste disposal sites are required to be enclosed and signposted to prevent trespassing. Disposal sites must be isolated from surface and underground water resources and measures taken to prevent leakage.

Another piece of legislation, the 1973 Chemical Substances Control Act, considers a chemical new if it is not included among the approximately

19,000 substances enumerated on a list compiled in 1973. A manufacturer or importer must provide the government with all available information concerning any new chemical. In addition, tests on persistence, accumulation properties and toxicity are performed at the expense of the manufacturer. Only then is a substance classified as being dangerous or safe.

#### Sweden

Sweden has a 1973 Act on Products Hazardous to Man or the Environment and a 1979 Ordinance on Product Notification. A producer or importer of a substance that is new must examine it for hazardous effects on health and the environment. He must furnish all information pertaining to the chemical on request to the government. Special permission may be required to produce a substance or product which is considered dangerous. There is also a provision for substances to be banned. The 1979 Ordinance requires the importer or producer to identify the chemical composition of products, including impurities that would be significant in evaluating human health and environmental hazards.

#### Canada

The Environmental Contaminants Act of 1975 classifies a new substance as one that is manufactured or imported for the first time in amounts exceeding 500 kg per year. All available information on effects of the chemical must be submitted to the government within three months of manufacture or import. The government may also require specific tests to be conducted so that a potentially hazardous substance may be categorized as dangerous and necessary measures taken to ban or restrict the use of the chemical.

#### Switzerland

In 1969, Switzerland became the first country to have a general chemical control law. Its law on Trade in Toxic Substances requires notification for all chemical substances and products before they are marketed. The substances are then classified into different groups on the basis of their acute toxicity and conditions for their sale and use.

#### France

The French Chemicals Control Act 1977 requires producers and importers of new chemicals and existing chemicals with new uses to provide relevant information on their effects on people and the environment. Permission for marketing of the chemical is given only after 30 days based on the information provided. Where necessary, further testing may be required to determine if the chemical should be banned or its use limited.

Similar laws also exist in Denmark and Norway. Other countries like Austria, Australia, the Federal Republic of Germany and the Netherlands are in the process of formulating new laws on the notification, testing and control of chemicals.

The pattern of hazardous waste management in the aforementioned industrialized countries includes the following:

- registration of wastes, waste generators, transporters and disposal operators;
- docket systems for tracing and controlling the movement of wastes;
- standards for the transport and disposal of wastes, and
- provision for civil liability and insurance.

In April 1981, the Governing Council of the United Nations Environment Programme (UNEP) urged all governments,

'to protect health and the environment, to ensure the institution of adequate protection measures for the handling and disposal of hazardous chemical wastes...'

## Global ban on toxic burning

Guardian, 7 Oct 1988

**Paul Brown**

**A**N INTERNATIONAL ban on the incineration of toxic wastes at sea by 1994 was agreed to by 65 nations yesterday at a meeting in London.

Settlement was reached after two days of wrangling over a Danish resolution to impose the ban from the end of this year. The five-year postponement went through after pressure from Britain and the United States.

The resolution, adopted at the annual London Dumping Convention, ordered an immediate halt to the export of noxious liquid wastes by member states for burning by countries which are not parties to the convention. This would prevent sea incineration plants being set up off Third World countries.

It also called on all countries to minimise or substan-

tially reduce the use of marine incineration by January 1, 1991, by developing alternative methods of disposal.

The ban, which will coincide with one in Europe, was welcomed by environmental groups, which have observer status at the convention. But they criticised Britain and the US for trying to leave the door open for the practice to continue away from their own shores.

Britain's view was that an immediate ban could mean that some countries, unable to find any environmentally safe method of disposing of waste, would dump it in ways that could lead to worse environmental damage. The US, which has already banned incineration off its shores, supported this.

Ms Lisa Busin from Greenpeace said the developing countries all supported an immediate ban, and that only the industrialised nations

wanted it put back. "I suspect their motives," she said. They want to keep the option open of sending their chemicals to the other side of the world to be burned on someone else's doorstep.

"This resolution should be a notice to the ocean incineration companies to pack up and go home."

But Mr Barry Ricketts, for the Association of Maritime Incinerators, which has two members, one Dutch and the other West German, with a total of three ships, said he believed ocean incineration could continue beyond 1994.

The resolution provided for scientific evaluation of incineration in 1992 and Mr Ricketts believed it would be possible to prove to the convention's scientists that the practice should continue. "It gives us a breathing space to prove the technology still has a place. In 1992 they can always change their minds."

# Final resolution

of the International Seminar  
Managing Hazardous Wastes: the  
Unmet Challenge\*

## GENERAL CONSIDERATIONS

CONSIDERING that special industrial wastes account for an estimated 160 million tons, of which 30 million tons are toxic and dangerous wastes;

Considering that every year more than 2.000 million tons of all kinds of wastes arise in the Twelve Member States of the European Community, that this amount is increasing by more than 70 million tons/year and is expected to reach more than 3.000 million tons by 1990;

Considering that whilst most industrial wastes are either reprocessed or disposed of with little harm to the environment, toxic and dangerous wastes undoubtedly represent one of the largest environmental protection problems at local, regional, national, community and international level, not so much because of the quantities involved but because of the particular risks connected with them (including toxicity, health hazards, threat to water quality, risks of infection, explosion or fire and corrosion hazards);

Considering that facilities for safe disposal of toxic and dangerous wastes are inadequate and provide suitable capacity for only 10 million tons. The capacity shortage in the European Community as a whole is therefore more than 60%;

Considering that action to ensure not only the proper treatment and safe disposal of such wastes, many of which are highly toxic, but also and notably the prevention and wherever possible the reuse thereof, is thus one of the foremost challenges for a *European no-dumping policy for hazardous wastes*;

Considering at a more general level, that the Economic and Social Committee has stated that 70-90% of the waste today is still destroyed or simply disposed of in tips;

Considering that there are several tens of thousands sites in the European Community, which are contaminated with hazardous wastes. That these sites are likely to present a hazard for public health and the environment. That the longer these sites are neglected, the greater the risk that hazardous substances from these sites will spread throughout the environment and therefore the more expensive final clean-up operations will be;

\* Organised by the European Environmental Bureau (EEB) and the Belgian Environmental Federations (Inter-Environment/Bond Beter Leefmilieu) Brussels, December 10-11, 1987.

Considering that for the sake of protecting the environment and public health, as well as in order to save valuable raw materials and energy potential, this state of affairs should not be allowed to persist;

Considering moreover, that the general public is becoming increasingly critical of dumping and incineration of waste at sea and of the mismanagement of disposal sites, as well as of the never ending stream of transfrontier shipments of hazardous wastes within Europe and to the Third World and therefore is calling for other solutions;

## COMMUNITY LEGISLATION ON HAZARDOUS WASTE

Recalling the First Environment Action Programme of the European Communities (1972-1976) and its call for a 'hard hitting campaign against waste';

Noting that the total waste stream in Europe is still growing despite this commitment of the European Community, which has been repeated in the Second-, Third- and Fourth Environment Action Programme of the European Communities, resp. (1977-1981), (1982-1986) and (1987-1992), and despite the adoption by the Council of Ministers of the European Communities of the following Directives in the field of waste prevention and disposal, notably: Directive 75/439/EEC of 16 June 1975 on the disposal of waste oils, Directive 75/442/EEC of 15 July 1975 on waste management, Directive 76/403/EEC of 6 April 1976 on the disposal of PCB's and PCT's, Directive 78/176/EEC of 20 February 1978 on waste from the titaniumdioxide industry, Directive 78/319/EEC of 20 March

1978 on toxic and dangerous wastes, Directive 84/631/EEC, 85/469/EEC and 86/279/EEC on the supervision and control of transfrontier shipment of hazardous wastes within the European Community as well as the Decision of 21 April 1976, setting up the Waste Management Committee and Recommendation 81/1972 on the reuse of old paper and the use of recycled paper;

Noting that this is to a large extent due to the non - or ill compliance by the Member States of the European Community with existing European environmental legislation;

Remarking however, that current European and national environmental legislation in the field of waste prevention and disposal is unlikely to solve present and future waste problems in Europe, because it does not attack the problem at its roots and leaves open too many 'escape routes'.

## THE NEED FOR A EUROPEAN NO-DUMPING POLICY

Calls upon the European Institutions (the Commission, the Parliament, the Economic and Social Committee and the Council of Ministers) to develop a *European no-dumping policy* based on the following principles:

- by the year 2000 definite landfill of hazardous wastes will no longer be permitted;
- in the meantime landfill will only be temporarily allowed pending the development of alternatives by the producer of the waste;
- dumping and incineration of hazardous wastes at sea has to be stopped immediately;
- existing products which are likely to

cause hazardous waste problems have to be identified and a policy has to be developed to phase out these products wherever possible;

- new products and processes should only be introduced after a preliminary Environmental Impact Assessment, including solutions for possible future waste problems;
- the Polluter Pays Principle should be strictly applied resulting in assigning the costs for adequate prevention and treatment of waste to the producer of the waste;
- the current system of liability and compensation for environmental damage should be changed: an EC-Directive introducing strict liability, a compulsory liability insurance and the establishment of a fund for the compensation of the injured party should be drafted by the Commission as soon as possible.

In order to be able to develop a *European no-dumping policy* the current practice of transfrontier shipments of hazardous wastes should be fundamentally changed: transfrontier shipments of hazardous wastes should only be permitted as an exception to the rule that the country of origin of the waste is responsible for adequate treatment of the waste in the country. If no adequate treatment of the waste in the country of origin exists, the waste should be exported to the facility where it can be best treated, over the shortest possible distance and within the framework of a European co-ordinated plan of treatment facilities. Exports of hazardous wastes outside the Community should be banned altogether.

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## **CLEAN-UP OF CONTAMINATED SITES**

Contaminated sites must be identified, investigated and cleaned-up if necessary from a health and environmental point of view. Isolation of a contaminated site cannot be considered as a final resolution. In accordance with the 'Polluter Pays Principle' the costs of reclamation and clean-up must fall on the polluter, costs should be carried by both government and industry. The development of adequate clean-up techniques must be given high priority. The conclusions of the Roelants du Vivier-report on the waste disposal industry and old waste dumps, drawn up on behalf of the European Parliament Committee on the Environment, Public Health and Consumer Protection are endorsed.

# Conclusions and Recommendations

By the WHO working group on guidelines  
for the control of toxic and other  
hazardous chemical waste,  
17-20 March 1981

## CONCLUSIONS

### PLANNING

1. One of the early requirements for development of a proper system of hazardous waste management is the availability of reliable information on the quantities and nature of waste and on currently used management practices.

### DEFINITIONS AND HEALTH EFFECTS

2. For the purpose of the Group's discussions, the term "hazardous waste" was preferred to either "toxic and other hazardous waste" or "toxic and other hazardous chemical waste". Neither radioactive nor hospital waste was specifically considered by the Group.

3. When considering the problems of managing hazardous waste, attention needs to be paid to the effects on health and the environment, with respect to both short-term, acute effects and long-term, more insidious effects, such as groundwater pollution.

4. With regard to worker protection, a clear distinction should be made between "hazardous" waste, which poses minimal risk to the worker, and that which presents a significant risk unless special safety precautions are taken. In general, the precautions should be at least as rigorous as for the corresponding pure substance, unless the risk from the waste is shown to be significantly less.

### TECHNOLOGY

5. Many technologies are currently available for hazardous waste management. A particular technology is usually not appropriate for all waste. In general, when a waste can be dealt with in several ways, the more "powerful" the technology and the lower the residual risk, the higher will be the cost. The appropriate technology in a particular case should be based on the concept of "best practicable means". The choice of appropriate means is not static and may change as technology develops and as society demands. Research and development are required in many aspects and should be encouraged.

## TRANSPORT

6. Transport of hazardous waste is best controlled in the context of general regulations on the transport of dangerous goods. However, hazardous waste may present additional problems because it has no positive value to the generator or transporter, its composition may not be precisely known, and the mixing of incompatible wastes for convenience in transit may create a hazard.

## GENERAL POLICY AND LEGISLATION

7. A national policy for hazardous waste management should be such that hazardous waste will have a legally acceptable transport, storage, treatment or disposal route. Otherwise, the policy will encourage improper disposal.

8. Hazardous waste management legislation can take many forms, depending on the legal system and other factors in the country. Legislation and regulations may be based on environmental discharge standards, environmental quality objectives, technical design and operating standards, economic incentives and disincentives, or a combination of any of these.

9. Socio-economic and political aspects must be considered within the context of hazardous waste management.

## LEGAL LIABILITY AND INSURANCE

10. Hazardous waste management must be based on the premise that the waste generator will be held responsible for selecting licensed contractors capable of providing safe transport and adequate storage, treatment or disposal of the waste. In some instances a waste generator will need to seek advice outside his own competence in order to discharge this responsibility.

11. Where permitted by the legal system of the country, both individuals and the corporate bodies employing them should be accountable for the consequences of any proven malpractice or negligence occurring at any point in the life cycle of hazardous waste within their management responsibility. Laws should be framed to permit their prosecution.

12. "Sudden and accidental" insurance coverage for hazardous waste management facilities is commonly available and often required by existing control programmes. Environmental damage insurance is an important but highly specialized measure. Adequate (or unlimited) insurance of the latter type may not be available unless a state insurance scheme is instituted.

## RECOMMENDATIONS

### GENERAL

1. UNEP and the WHO Regional Office for Europe should jointly produce documentation, including both policy guidelines and a code of good practice, which will serve as a guide to decision-makers with responsibility for the management of hazardous waste. Many detailed recommendations on the form and content of such documentation were made by the Group.

2. After completion of the current activity, WHO should produce much more detailed background information and documentation on certain specific (mainly technical) aspects of the overall hazardous waste problem.

### DEFINITIONS AND HEALTH EFFECTS

3. Formal, legalistic definitions of terms such as "hazardous waste" should not be attempted in the context of international guidelines at this time. The best way

forward is to adopt pragmatic, working definitions which focus more on the hazard characteristics of the waste than on its form or composition.

4. Comprehensive, analytical data on the composition of many wastes are often extremely difficult to obtain. Therefore, requirements for analytical information on waste composition should be consistent with the necessity to decide on appropriate management methods and to evaluate inherent risks. Such analysis should use verified protocols and methods. WHO should consider compiling simple analytical methods suitable for use by countries just developing a hazardous waste management programme.

## TECHNOLOGY

5. Much is known about technologies for hazardous waste management applied in developed countries, but rather less is known where developing countries are concerned. Considerable attention in the ongoing UNEP and WHO activities should be given to identifying, and developing guidance on solving, the specific hazardous waste problems of developing countries. Research and development work should also be encouraged.

6. Uncontrolled dumping is an unsatisfactory method of disposal for hazardous waste and should be phased out. However, specific guidance should be given to developing countries, both on alternatives and on procedures for closing existing dumps, so that they do not pose problems in the future.

7. Post-closure care of sites that have been used for the disposal of hazardous waste should include appropriate monitoring for potential pollution, maintenance of control devices (such as landfill cover) and measures aimed at pre-

venting inappropriate future use of that land. The fact that a site has been used for land disposal of hazardous waste should be recorded in the ownership deeds.

8. UNEP and WHO should develop methods both for locating abandoned dumping sites containing hazardous waste and for their reclamation, specifically to guide the developing countries.

## TRANSFRONTIER TRANSPORT

9. Transfrontier shipment of hazardous waste should be regulated on the basis of pre-notification to the designated competent authorities of both the exporting and the receiving countries. The receiving country should be responsible for ensuring that the waste is transported, stored, treated and disposed of according to its standards. However, specific attention needs to be given to the problems of developing countries, whose authorities may not have the expertise to evaluate the technical feasibility or environmental safety of a proposed hazardous waste disposal facility in their country.

## GENERAL POLICY AND LEGISLATION

10. The general environmental protection laws which countries have, or are planning to promulgate, should stipulate appropriate institutional measures to be included for hazardous waste management.

11. Government should be responsible for providing an adequate system of laws, controls and administrative procedures for hazardous waste management. Other governmental responsibilities will vary according to the constitution and practices in the individual country. The right of appeal against

decisions made by the controlling authorities should, however, be safeguarded.

### CONTROL AND LICENSING

12. In the interim period while a comprehensive control system for hazardous waste management is being established in a (developing) country, responsibility for advice and guidance on technical aspects should be given to an appropriate technical unit, preferably one already in government service, with support as appropriate from the international organizations.

13. Hazardous waste management should be regulated on the basis of "cradle-to-grave" control. Sources (producers) of hazardous waste should be registered, and all interim storage, transport, treatment and disposal facilities should be licensed. A manifest or trip-ticket system should be used to ensure that the waste arrives at its designated destination. The registration, licensing and manifest systems should be administered and monitored by a suitable public controlling authority which, depending on the country, may be at a national, regional, or local level.

14. A licence for a waste storage, treatment or disposal facility must stipulate the right of legitimate access for the controlling authority, and must allow it to carry out works necessary to remedy the effects of malpractice at the licence holder's cost if he cannot

or will not take remedial action himself.

### TRAINING

15. All personnel involved in hazardous waste management, including those at the policy, management, control and operational levels, should be suitably qualified and properly trained. Training programmes need to be developed, particularly in countries where hazardous waste management is still at an early stage.

### DISSEMINATION OF INFORMATION

16. Public involvement in hazardous waste management activities should be encouraged and education on this subject should be undertaken, which may require the preparation of material for public education.

17. Reports and papers relating to the present discussions and to further work in the same field should be distributed to national ministries concerned with commerce and transportation, as well as those concerned with the environment and health.

18. Appropriate mechanisms should be developed by UNEP and WHO to enable them to provide support to any country requesting help in implementing the guidelines in order to institute a system of control for hazardous waste management.

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This chapter appears in Annex 3 in 'Management of Hazardous Waste' by the World Health Organisation, 1983 (WHO Regional European Series No. 14).



# TOXIC TERROR

**TOXIC WASTE DUMPING** has been going on in the Third World for several years. Countries in the West, faced with stringent environmental laws, find it cheaper to export their wastes to poor Third World countries, than to dispose of the wastes themselves.

The Third World countries are left literally holding on to the toxic wastes, their citizens suffering health consequences and their environment destroyed.

This book puts together documents related to toxic wastes and their export to the Third World, as well as gives recommendations on what Third World governments and peoples should do in future to minimise the risk of hazardous wastes, whether imported or locally produced.



The Third World Network is a grouping of organizations and individuals involved in Third World and development issues.

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